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All communications to the Editor, 22 Harlington Road East, Feltham, Middlesex, England. Telephone Feltham 3740.

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BOOK REVIEW

Britain's Nature Reserves, by E. M. Nicholson. Country Life Ltd. 175 pp., illustrated. Price £1 10s.

This is a book of considerable interest to all naturalists and others in that it gives descriptions of a number of Nature Reserves which have been established throughout Britain, mostly since the Nature Conservancy came into existence at the end of 1949. The introductory chapter is intended to instruct in the meaning and object of Reserves, but on some points it is not clear. The classification of Reserves as 'natural', 'semi-natural' and 'artificial' is less important than the question why the various types of scheduled areas have been selected and that is only discoverable by much searching. The 'natural', as opposed to the other types, are 'undisturbed habitats and are set aside entirely to preserve the fauna and flora, being as far as possible a safeguard against human intrusion or interference of any kind'. To the uninitiated this means that once an area is adopted, it is fenced off and left to itself, and that idea is supported by a statement (p. 23) that by 'a carefully balanced selection of the best surviving examples of different habitats . . . . it will be possible

for scientists in the distant future to continue to have available for study first-class examples of each type of habitat'. If that is what is to be done the areas will rapidly change their characters and many will certainly end as tangles of scrub.

An adopted area requires regular attention (interference) to prevent its degenerating. But such an undisturbed area may have been selected merely because of the richness of its fauna and flora, in which case regular interference may enable the conservators to maintain it as an interesting reserve for some time. On the other hand, if the area was selected because of the presence of certain rare animals or plants, it is unlikely that intelligent interference will do much to slow down the rate of evolution of the community or to delay the disappearance of the protected species.

Therefore the question arises, how far is the Conservancy justified in buying these reserve areas which, in a longer or shorter time and at an annual financial outlay, will cease to be of the scientific interest for which they were acquired? The author admits that nearly half of the 122,000 acres already scheduled are 'owned' by the Conservancy, so that roughly 60,000 acres have already been nationalized! Even the Labour Party is not unanimous as to the success of nationalization, and the Conservative Party at once de-nationalized road transport when they came into power; and yet they passed the Act which is being used to nationalize land!

The descriptions of the different reserves and photographs, some of which have already appeared in the Annual Reports, together with information as to the position of the area and, if entry is permissible, how it may be obtained, makes this a useful as well as an interesting book, but, coming after the acquisition of Rum and the tactless way that was announced and the feelings aroused, at least in Scotland, this seems rather like an aftermath of that disturbance.

FRANK BALFOUR-BROWNE.

TRINOPHYLUM CRIBRATUM BATES AT LIGHT (COL: CERAMBYCIDAE)

Every year several specimens of this Indian Cerambycid (now established in a near-by timber yard) are found in my Mercury Vapour light trap. The first this year, a male, arrived on the night of 15th July, 1958.

E. W. CLASSEY.

Feltham, Middlesex.

A DESCRIPTIVE NOTE ON THE LARVA OF *LEUCANIA UNIPUNCTA* (HAWORTH) (LEP: CARADRINIDAE)

By G. HAGGETT

Both Mr. Robin Mere and Mr. Austin Richardson were good enough to send me young larvae of *L. unipuncta* from eggs laid by moths taken by them in the Scilly Isles.

As the life history is so well known abroad, and as the length of the cycle is known to be so variable and so easily controlled, we in Britain are doubtless more interested in discovering how many broods the species may pass wild in a season of British climate, and, should it be breeding regularly, how it passes the winter.

From one batch of eggs laid about 7th October, and hatching within a week, larvae kept in a warm, dark cupboard moulted five times, spending only three to four days in each instar except the last, of which a good deal was passed in prepupation, and pupating from 8th November. Some were kept in cooler conditions for the first fortnight and their growth was much retarded, but when put with the others at 70 deg. F. these soon caught them up. Larvae did not like being exposed to light or being irritated at all, even by their own kind; they had the habit of jerking violently the head and thorax and at the same time of emitting from the head a quantity of bright green fluid. They were fed on Cock's-foot grass.

Some larvae chewed a soft but fairly tight fitting cocoon in which to pupate, others simply occupied an unprepared crevice.

During the first instar the tiny larvae were whitish with a shining black head. From the first moult until the fourth (Plate VII, Fig. 1) they were much greenish suffused and inclined to light brown laterally, the dorsal space thickened and the dorsal line mostly obscured so that the only conspicuous pale areas were broad stripes above each sub-dorsal; the intersegmental folds bold and yellowish.

In the fifth instar that larva assumes a pattern more like its final skin, but it may be so heavily darkened with purplish that only the subspiracular bands are well defined (Plate VII, Fig. 2). At this stage the *unipuncta* larva is basically purplish or deep rosy red, but there is so much darker suffusion that the red shows only narrowly to each side of the heavy dorsal shading; other stripes and bands are a mixture of dark olive, purple and deep grey. Sub-spiracular band broad, pale yellowish and centred with orange dashes, edge conspicuously above by a strong velvety black line. Below the band the skin is a greenish-grey. Dorsal stripe obscure and marked by parallel dark lines. True legs dark brown, prolegs grey and banded with black, anal claspers edged by the pale sub-spiracular band.

Head dark brown with two darker stripes in front and with much blackish freckling. A lighter form (Plate VII, Fig. 3) has a pinkish ground colour and the subdorsal lines may show immature black streaks. The skin has the wet, shining appearance when viewed in certain lights, as have larvae of *L. favicolor* Barrett and *L. l-album* (L.).

Description of sixth and final instar (Plate VII, Figs. 4-6). At full growth measures to 32 mm. long. Cylindrical in shape, a little flattened at the thorax especially when at rest, when also the ultimate abdominal segments are prostrate and the anal claspers displayed behind; most of the Leucanias are apt to adopt this posture, but it is particularly evident in this species as it is in *L. comma* (L.). The obesity of *unipuncta* is also more like that species than the longer and slenderer members of the genus.

The pattern is simple. The dorsal line is weak and white only at the intersegmental areas, and especially on the thorax, the rest of it being obscured by the suffusion of its dark margins. The space between the dorsal line and the subdorsal is divided into a broader darker upper region and a slightly narrower pale one below where it adjoins a smoky band bearing a black dash on each of the abdominal rings, which in turn margins a narrow crinkled whitish subdorsal line below. The lateral space is occupied by an upper orange band and a rather broader dark band below, there being the suggestion of a narrow faint line between them. The sub-spiracular band is broad pale cream and streaked with orange. Ventrally the skin is a pale nondescript hue of olive grey tinged with green.

Head large, shining, rounded, a uniform yellow brown, with a pair of dark brown vertical stripes in front that converge towards the suture and with a shorter and straighter dark streak again before the ocelli; in the darker forms there is a close black network on the lobes. Prothoracic plate dark brown, crossed boldly by the white dorsal stripe which is strongly dark edged and also by the white subdorsals which are edged darker only on the dorsal line. Anal plate dull brown, divided by the whitish dorsal stripe. Thoracic legs brown, prolegs greyish, small, tucked well beneath the fleshy folds of their segments when not in use, the anal claspers grey-brown and streaked in dark brown down the side. Spiracles oval, black, all situated at the centre of the segment at the upper edge of the pale subspiracular band. Warts small, black, and bearing short soft hairs. Skin very smooth and still with the wet appearance when taut.

As with many larvae the colours and pattern of *unipuncta* are best described as they appear to the naked eye. When examined under even a moderate lens the colours disintegrate into a complicated jigsaw of freckles that would be meaningless to describe and hopeless to convey.

The larva is most variable in appearance, and while the dark and light extremes can be well separated there is every graduation between them.

LARVAE OF *LEUCANIA UNIPUNCTA* (Haw.)

Fig. 1: Fourth instar. Figs. 2 and 3: Fifth instar. Figs. 4-6: Sixth instar. —Photo by George Hyde from original drawings by G. Haggett.

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The palest (Plate VII, Fig. 4) has the ground colour of a fawn or putty hue common to many of the genus, and the thorax shaded with greenish and bluish. Others have a rosy or pink tinge. The darkest forms (Plate VII, Figs. 5 and 6) are the most striking and are like no other type of Leucanid known from Britain, being not unlike some Hadenids; the entire dorsum is a soft olive or ochreous grey, dusted transversely by darker streaks, the lateral space above the sub-spiracular is of the darkest blue-grey in marked contrast to the cream band below and the dulled orange band above. The brightness of the pale sub-spiraculars is relieved by a series of vermilion or orange streaks along the abdomen. The subdorsal black dashes are well developed and the narrow dorsal line is enhanced and particularly bold on the prothoracic plate. The head and plates are correspondingly darker.

SOME NOTES ON *LEUCANIA UNIPUNCTA* (HAW.) (LEP: CARADRINIDAE)

Having reared a small brood of *Leucania unipuncta* from young larvae kindly given me by Mr. R. M. Mere, the following observations may be of interest.

Pairing. Imagines were confined in a newspaper tube 15 inches high by 5 inches in diameter. They were fed on brown sugar and water, and lived for over four weeks at cool room temperature. No actual pairing was observed, but fertile ova were obtained.

All ova were laid on the grass provided, a few were laid openly on the blades, but most were deposited and neatly sealed within twists of the blade or between the blade and the stem in tightly packed rows.

The larvae spent the hours of daylight hidden at the roots of the food-plant. They consumed an amazing quantity even though they fed only at night.

Pupation was in a light cocoon placed vertically as low as possible amongst the grass stems. This situation seemed to be preferred to the compost provided.

J. E. KNIGHT.

'Doughton Cottage',
Ross-on-Wye, Herefordshire.

COLLECTING IN INVERNESS-SHIRE

Mr. P. Le Masurier, well known to many of our readers, offers hotel accommodation with special facilities and at moderate cost at Aviemore. We thoroughly recommend and wish Mr. Le Masurier every success in his new venture. Full details are printed elsewhere in this issue.

Eds.

BOOK REVIEW

A Critical Review of the Techniques for Testing Insecticides, by J. R. Busvine. London, 1957. Commonwealth Institute of Entomology. Lge. 8vo. pp. ix; 208. Cloth. Price £1 10s.

The past decade has seen the discovery of many powerful synthetic insecticides which have come to dominate the field of insect control. The proper use of these synthetics is very dependent upon the availability of suitable means of testing in the laboratory, and much time and ingenuity have been expended in the development of the necessary apparatus. The relevant literature is already large, but much of the practical work has been undertaken, in a haphazard way, by small and very independent teams of investigators. There has been much duplication of effort and a serious lack of standardization of technique is apparent. Dr. Busvine's review should do much to redress this state of affairs and should stimulate the development of improved and, perhaps, simplified methods of testing.

The book contains twelve chapters, of which the first sets out the general principles of insecticide testing. There follow chapters dealing with the techniques of handling test-insects and of rearing standardized cultures. The three main classes of insecticides, namely stomach poisons, contact poisons and fumigants are treated separately. Methods of evaluation suited to the various modes of formulation of these insecticides are described and their efficacy is considered in the light of the physical and chemical factors involved. Insect repellants are also covered and the work includes a useful survey of statistical aspects of toxicology.

The text is illustrated with fifty figures which, for the most part, serve to convey the points intended, but the standard of draughtsmanship displayed is not high, and the drawings by no means please the eye. However, the impressive list of references (over 550 of them), from a very diverse literature, would alone more than justify the purchase of the book.

B. P. MOORE.

URGENTLY WANTED

Short papers of less than about three pages—and short notes and observations.

We have no difficulty in obtaining the longer papers on which the popularity and fame of *Entomologist's Gazette* are founded and maintained, but we seldom have enough material in hand of the type now solicited.

Nearly all subscribers must have many notes of interest tucked away in their collecting diaries and breeding notes which could be of interest and value to fellow entomologists. Please send any contributions of this kind to Mr. A. E. Gardner, 29 Glenfield Road, Banstead, Surrey.

EDITORS.

SOME PRELIMINARY OBSERVATIONS ON THE LEPIDOPTERA OF THE ISLES OF SCILLY WITH PARTICULAR REFERENCE TO TRESCO

PART I—GENERAL

By AUSTIN RICHARDSON, F.R.E.S., AND ROBIN M. MERE, F.R.E.S.

'The insect fauna of any outlying and geographically sharply separated area must always be of particular interest to the student both of distribution and of local races. The Scilly Isles, bleak and windswept as they are, could not be expected to afford a very abundant lepidopterous fauna, though from their isolated position, separated by twenty miles of sea from the mainland, some interesting local races might perhaps be expected.'

These are the opening words of Dr. K. G. Blair's '*The Lepidoptera of the Scilly Isles*', published in January, 1925, in *The Entomologist* (4). They are as true to-day as they were then. The interest which has been taken in recent years in the lepidoptera of the Shetlands, the Hebrides and other Scottish Islands bears witness of the scope which still exists for further discovery and investigation.

Almost every year several entomologists visit the Shetlands and the Hebrides. The work of Mr. J. L. Campbell on Canna and of Professor J. W. Heslop Harrison and his associates in the Scottish Isles is well known. The lepidoptera of Fair Isle have been investigated by Mr. D. E. Hardy (16). It is the more remarkable that before 1956 so very little appears to have been attempted in the Scillies, were it not for the well-known phenomenon of 'Hamstreetitis', which appears to affect the majority of lepidopterists, namely, always going to a well worked and known locality rather than to an unknown or unworked one.

The Isles of Scilly consist of a large number of islands, situated 28 miles west south-west of Lands End, of which six are now inhabited, four others are of fair size, and the remaining 140 are islets, stacks and reefs. The climate is mild but some light frosts occur nearly every winter. The rainfall is much less than that of the mainland of Cornwall or Devon, but strong winds are frequent and this possibly accounts for the lack of indigenous trees. Tresco alone is well wooded and there are a fair number of trees on St. Mary's and some shelter hedge and bushes on the other inhabited islands.

The islands were probably treeless a few hundred years ago. They are of granite covered in most parts with peaty or sandy soil, also there are a number of sand dunes. Tresco, situated in the middle

of the group, has, except at the northern end, less cliffs and rocks than the outlying islands.

It seems likely that the Isles of Scilly were united to the mainland during Miocene times between 15 and 35 million years ago. They were subsequently at least once totally submerged, and it is thought that they probably finally emerged from beneath the sea at some stage during the Pleistocene or Glacial Period—i.e. less than a million years ago.

Charlesworth (6) suggests that the presence in the Scillies of Irish Old Red Sandstone glacial erratics to within 20 feet of the highest point indicates that erratic-bearing ice-floes 'calved' off the Irish Sea ice-shelf, drifted up the English Channel, and became stranded over the emerging islands.

While according to Barrow (3) movements of sea level totalling more than 80 feet (40+, 40—) have undoubtedly occurred since late Glacial times, it would seem that since their final re-emergence the Isles of Scilly have never been joined to the mainland.

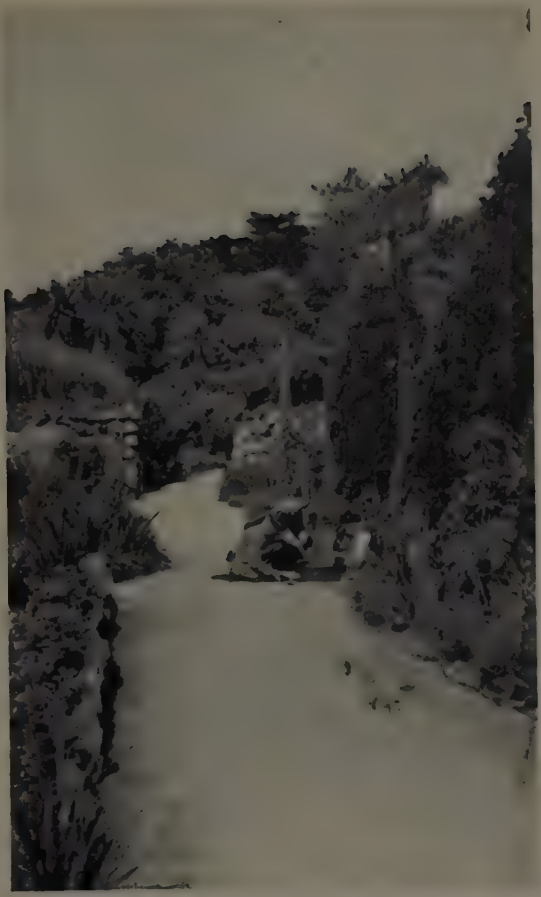
Dr. E. B. Ford and his associates have worked the Isles of Scilly extensively in their valuable genetical investigations, but these have, we believe, been confined to butterflies.

It was therefore left to 'collectors', nowadays a somewhat despised race, to make fairly considerable additions to the islands', and indeed an addition to Britain's, known fauna, and to disprove some of the conclusions arrived at by Ford (13).

The late Mr. C. G. Clutterbuck spent August, 1939, and several subsequent visits on St. Mary's and wrote an account in *The Entomologist* (7). Mr. George Manley spent four days in the Scillies in April, 1953 (21). And Mr. David More spent a week on Bryher in July, 1955. Mr. More, like others before him, was greatly impressed with the possibilities of the Scillies, and, independently, fired by his enthusiasm, we planned to visit Tresco in September, 1956. In the event only one of us was then able to go, but in all seven visits have been made as follows:

A. 3rd to 16th September, 1956. A.R.
B. 22nd to 31st April, 1957. A.R.
C. 18th to 25th May, 1957. R.M.M., Mr. David More (D.M.) and Mr. E. J. Hare (E.J.H.).
D. 29th June to 6th July, 1957. R.M.M. and Mr. E. C. Pelham-Clinton (E.C.P.C.).
E. 1st to 11th August, 1957. A.R.
F. 9th to 21st September, 1957. A.R.
G. 17th to 27th September, 1957. R.M.M., part time D.M. and part time Mr. H. C. Huggins (H.C.H.).

To save space and repetition, the initials of the authors and other visitors to the Scillies are used on the second and subsequent refer-



The Middle Terrace, Tresco Abbey Gardens, showing giant Echiums and other exotic flora.

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ences to them and the visits made by us are referred to by the letter shown on the left of the dates.

These seven visits were based on the Island of Tresco, which is the most wooded island. Lieutenant-Commander T. M. Dorrien-Smith, R.N., most kindly gave us special permission to collect and run Mercury Vapour traps in his world-famous gardens for the purpose of ascertaining what species occurred there.

We take this opportunity to thank Commander Dorrien-Smith again for his kindness and generosity in granting us these privileges and permitting us to collect in his gardens, and also for his hospitality and help.

The gardens of Tresco Abbey are unique and have the very greatest botanical interest in addition to their beauty. They contain many exotic and semi-tropical plants, shrubs and trees which probably grow outdoors nowhere else in the British Isles. There are a number of species of palm trees, cacti, giant echiums, yuccas, fern trees, daturas, myrtles, etc.; trees introduced on the mainland such as gum, holm oak and cypress; and more ordinary trees (though many not found elsewhere in the Scillies) such as white poplar, sycamore, oak, ash, elm, hawthorn, beech and alder. The gardens provide shelter somewhere or other, whatever the direction of the wind.

Parts of the coast of Tresco and other islands are sand dunes, with marram grass, sea holly, sea rocket, etc. There are large areas of peaty moorland with bramble, grasses, heather, heath, gorse and bracken. Shelter belts of Monterey Pine are to be found, wayside hedges with Cornish Elm, a long line of sallows, a few hawthorns, and a very few privet bushes. The bulb fields are protected with hedges of escallonia or pittosporum, and, in addition to the usual weeds, contain much forget-me-not and some marigold. In places there is knotgrass in profusion. Also to be found are uncultivated areas with bramble, thistle, henbane, ragwort, mullein, scrophularia, red campion, nettles, chamomile, etc. There is a small area with much sea campion which on Tresco does not grow on the cliffs as elsewhere in England, and several areas with tree mallows. Thrift is abundant. There are countless other plants not mentioned. Finally there is an extensive fresh water marsh with reed beds.

Not only did we receive much kindness and help from Commander Dorrien-Smith and his agent, Mr. Ward, but others living on Tresco, too numerous to mention by name individually, helped us in many different ways. To all of them we wish to express our thanks for their kindness and understanding.

In addition to our own investigations, valuable information has been given to us by Mr. R. F. Bretherton (R.F.B.), who visited St. Mary's from 31st August to 7th September, 1957, by Mr. R. P. Demuth, who visited Bryher from 16th to 27th September, 1957, and Messrs.

A. Kennard (A.K.) and A. Seaton, who visited Tresco in early January, 1958. We wish to thank them all and also Mr. R. S. Tubbs for information.

The prime object of our visits was to see what species of lepidoptera were to be found in the Scillies, and record and investigate any local forms or races. The results were beyond our best hopes.

The main form of sampling the population was the Mercury Vapour Trap. Several traps were run in various parts of Tresco connected to the main electricity supply. In addition, a portable generator enabled samplings to be made well away from any habitation, though some 500 yards of electric cable permitted a wide range of sites to be trapped using mains electricity. Sugaring was used extensively in August and September, but was a complete failure at other times. Searching for larvae both by day and by night, dusking, searching at ivy blossom, collecting at dawn, and other methods were all used.

The result of our seven visits has been to add about 115 species to Dr. Blair's list. In detail we have added about 50, an increase of 30 per cent., to the macro-lepidoptera, over 40, an increase of 70 per cent., to the number of Pyrales and Tortrices, and over 25, an increase of 50 per cent., to the Tineias.

Perhaps even more interesting than what is recorded is what is not recorded. A number of species appear to be absent, which are common enough on the mainland of Cornwall, and the larvae of which feed on grasses and other low plants indigenous to the Scillies. Examples are *Philudoria potatoria* L. (Drinker Moth), *Leucania lithargyria* Esp. (Clay Moth) and *L. conigera* Schiff. (Brown Line, Bright Eye). It is understandable that many insects are absent whose larvae feed on trees, etc., now found but not indigenous in the Scillies. Yet it is surprising to find *Orthosia stabilis* Schiff. (Common Quaker), but to find neither *O. cruda* Schiff. (Small Quaker), *O. incerta* Hufn. (Clouded Drab), nor *O. gothica* L. (Hebrew Character) flying with it. *Agrotis vestigialis* Hübn. (Archer's Dart) is not on the sand hills, and the comparative scarcity of Silene may account for the absence of *Hadena barrettii* Doub. (Barrett's Marbled Coronet), *H. caesia* Schiff. (The Grey) and *H. lepida* Esp. (Tawny Shears). In this connection we should point out that Donovan (11) states *barrettii* is found in the Scillies, but we have neither found the insect nor any other record of it from the Scillies.

A noteworthy feature is the isolation caused by quite short stretches of water. Dr. E. B. Ford (12) has commented on this. Thus during visit D one possible but unverified *Pieris brassicae* L. (Large White) was seen on Tresco, the common white being *P. rapae* L. (Small White). Yet at the same time on St. Mary's, *P. brassicae* was very common and *P. rapae* uncommon. This is particularly remarkable

because *P. brassicae* is a well-known migrant. At the same time *Phlyctaenia prunalis* Schiff. was common on St. Mary's, at least a dozen being seen in a little over an hour: yet not one was seen on Tresco in a week.

Another interesting feature is the occasional vast swarms of larvae which occur. The swarming of larvae of *Arctia caja* L. (Garden Tiger) in the Scillies is mentioned by Frohawk (14).

We saw immense numbers of these larvae together with a few of *P. fuliginosa* L. (Ruby Tiger) on one area of Gugh on 18th September, 1957. They were of all sizes, many larger than normal size for hibernation, and some which were in the last instar pupated shortly afterwards. There was a similar infestation on St. Martin's in April. Investigation is needed to find out whether a few *A. caja* larvae feed up in this way every autumn in the Scillies, or whether the excessive numbers by some unknown mechanism lead to this unusual state of affairs. A swarm of *Lasiocampa trifolii* Schiff. (Grass Eggar) was found on Tean during visit B.

No wild second brood imagines of *A. caja* were noted (though a specimen with yellow hindwings was bred on 10th October, 1957), but other unusual second broods occurred. Fresh *Leucania littoralis* Curt. (Shore Wainscot) were plentiful on Tresco on visits F. and G. though not on Bryher. Two broods of *Boarmia rhomboidaria* Schiff. (Willow Beauty) were noted in May and September. This and the previous species are double brooded in the southern part of Europe. Fresh *Crocallis elinguaria* L. (Scalloped Oak) were seen in mid-May visit C, but whether this species is double brooded or has a very prolonged emergence period is not known.

The insect population of the islands is evidently as subject to yearly climatic variations as is that of the mainland. We have only, so far, been able to compare two similar periods in different years, but in them the difference was most marked. In September, 1956, the common residents, such as *Agrotis puta* Hübn. (Shuttle Shaped Dart), *Triphaena comes* Hübn. (Lesser Yellow Underwing), *Thalpophila matura* Hübn. (Straw Underwing), and *Luperina testacea* Schiff. (Flounced Rustic) were abundant, and in addition migrants such as *Acherontia atropos* L. (Deaths Head Hawk), *Herse convolvuli* L. (Convolvulus Hawk) and *Plusia gamma* L. (Silver Y) were much in evidence. In September, 1957, the common residents were relatively scarce at light and sugar, and migrants were few and far between. This scarcity of common moths was not unexpected, as most of the spring feeding larvae had seemed few and hard to find at the end of April. Many of these, such as *Diarsia brunnea* Schiff. (Purple Clay), *D. festiva* Schiff. (Ingrailed Clay), and *Polia nebulosa* Hufn. (Grey Arches), larvae of which were not seen at all, had evidently already gone down owing to the unusually early season, but one would

have expected others to be coming on in their place. On the other hand 1957 produced a strong second brood of *Leucania littoralis* Curt. (Shore Wainscot) of which the larvae had been common on the marrams in April. In September at least fifty very fresh specimens were seen, as compared with three worn specimens noted in 1956.

As might be expected in such a smokeless locality, with its damp sea air, lichens and some lichen-feeding species are very common, notably *Lithosia quadra* L. (Four Spotted Footmen), *Atolmis rubricollis* L. (Red Necked Footmen) and *Cleorodes lichenaria* Hufn. (Brussels Lace). On the other hand *Eilema lurideola* Zinck. (Common Footman), *E. complana* L. (Scarce Footmen) and *E. griseola* Hübn. (Dingy Footmen) do not appear plentiful and seem to have made their appearance in the islands since 1925. *E. caniola* Hübn. (Hoary Footman) seems to be a rather surprising absentee.

The most interesting insect found was undoubtedly *Cosymbia puppillaria* Hübn. (Blair's Mocha). Norgate (23) recorded *C. porata* L. (False Mocha) from Tresco in August, 1878. These were most probably *puppillaria,* since *porata* is not found in Cornwall. Cockayne (9) states that two '*porata* abs.' in his collection labelled 'Scilly Isles, F. D. Wheeler Coll.', are *puppillaria* and not the same insects as Norgate's unless Norgate gave two *puppillaria* to Wheeler. Wheeler's were probably taken before 1895 on Tresco. In September, 1956, visit A., A.R. took two, a ♂ and a ♀. In April, 1957, visit B., he took three more ♂♂. In May, 1957, visit C., R.M.M. took two ♀♀, and four generations have at the time of writing been bred from one of these latter. In August, 1957, visit E., A.R. took a ♂. All these came to Mercury Vapour lamps. In September, 1957, Mr. E. Grant disturbed a ♂ while carrying on his work of a gardener in Tresco Abbey gardens, and boxed it as it settled on a leaf. In late September, 1957, visit G., a larva in the last instar was found by R.M.M. feeding on Holm Oak. The Abbey Gardens were extensively worked on all our seven visits. During visits B., C., D., E. and F. they were worked deliberately and regularly for *puppillaria,* using two Mercury Vapour traps, hand lamps, etc. The fact that eight imagines only were seen by us would appear to show that *puppillaria* is a very scarce or a very sluggish insect, and without Mercury Vapour traps very unlikely to be met with, though it is possible that we did not strike a maximum emergence. A bred ♀ was released by R.M.M. on Tresco in September, 1957. It seems to us likely that *puppillaria* has been breeding continuously on Tresco for the last eighty years.

Except in the last instar, the larva seems unable to eat other than soft young leaves. Holm Oak, which is a food-plant on Tresco, grows extensively in the Abbey Gardens, where it has an autumn as well as a spring growth of new leaves, and frequent pruning of some trees ensures a lengthy period of growth of new leaves. These facts,

coupled with the mild climate, may well account for *puppillaria* being able to continue breeding there over many years. The pruning, by separating ova and larvae from the food-plant, may be a factor in keeping the insect's numbers so low. Nor is it known how it passes the winter in the wild state, and here too may be a factor leading to rarity. It seems that the pupa dies if the imago does not emerge within a period, and Dr. H. B. D. Kettlewell has suggested (*in litt.*) that *puppillaria* passes the winter as a last instar larva in a state of hibernation. We feel that this is quite possibly what happens, although the other British Cosymbias pass the winter as pupae.

During 1957 broods seem to have emerged in April-May, early July, late August-September, and it is considered probably in October.

The colour and markings of *puppillaria* vary a great deal. From the results so far obtained, there seems to be no obvious genetical basis, and Dr. Kettlewell has suggested that it may be a temperature effect. It is hoped that further breeding experiments may test and prove this suggestion. (See Figs. 7, 8 and 9.)

Leucania unipuncta Haw. (White Speck) is undoubtedly resident in the islands at the moment, and B. W. Adkin (1) believed it to be breeding there 50 years ago. Three very fresh specimens were taken in September, 1956, and two worn ones in August, 1957, all on Tresco. We struck the main emergence, however, in September, 1957, when 70 to 80 specimens, including a melanic (see Part 3), were recorded, at light, sugar and ivy, by A.R., R.M.M., D.M. and H.C.H. on Tresco, R.P.D. on Bryher, and R.F.B. on St. Mary's. Considerable variation was shown, some specimens being of a clear yellow-brown ground colour, some more, some less, suffused with red. Others, more commonly, were dotted and speckled with darker brown, and in some of these a black line was present, passing below the stigmata and through the white speck, which was sometimes elongated. In the darker specimens the red stigmata were usually clearly visible.

The insect has never before been bred *ab ovo* in Britain, though P. P. Millman claimed to have bred a specimen from a wild larva. Wild larvae would probably be quite hard to find because they take instant and violent avoiding action when confronted with a light, and their greenish-grey stripes harmonise well with their food-plant grass. Incidentally, they have a habit when touched or disturbed of ejecting a yellowish fluid from their mouths. Several attempts have previously been made to obtain ova, notably by L. W. Newman in 1912, by Colonel C. Donovan in 1928, by A.R. in 1946, and again in August, 1957. These have usually resulted in a few infertile ova being laid as an expiring effort. However, in September, 1957, three ♀♀ were kept by A.R. and R.M.M. and all proved fertile. Some 600 to 700 ova resulted, and many larvae were distributed to col-

lectors. Both of us have obtained pairings of moths resulting from these ova, and at the time of writing have larvae and pupae of the F.2 generation.

The ova were laid, often pushed well down out of sight, in the sheaths and curls of Cocks-foot Grass (*Dactylis glomerata*) and other grasses by the wild ♀♀ in large sized cardboard pill-boxes and 3 in. glass topped tins, some even on the sides of the box where the grass has pressed against them. A fairly large cage, of ¾ cubic foot, was found necessary to obtain pairings of the F.1 imagines. The newly-hatched larvae are extremely small, but fed up quickly when kept near a radiator, at a temperature of about 68 deg. F., on a mixture of *D. glomerata* and *Poa annua* in the case of A.R., and on *Holcus mollis, H. lanatus* and occasionally a little Couch grass (*Agropyrum repens*) in the case of R.M.M. The larvae of A.R. seemed to prefer the *P. annua* when small, but the *Dactylis* proved more satisfying as they grew older. The larvae hatched in about eight days and started to go down after a further 26 days, and to emerge 17 to 21 days later. As was to be expected from an agricultural pest, they are very tough and no trouble occurred, even though they were kept 50 to 60 in half-sized biscuit tins in their last stages, or fed on damp grass. The pupae seem small for the size of the moth. A.R.'s imagines again showed great variation, similar to the wild specimens, but R.M.M.'s were uniformly dark red-brown, though some were speckled. No melanic specimen has appeared out of over 450: it is probably a recessive.

Leucania loreyi Dup. (The Cosmopolitan). This migrant species, of which one slightly aberrant specimen lacking the usual white spots, was taken at sugar on visit F, is now the most rare British Wainscot, not many more than a dozen having been taken in this country so far. 1945 was an exceptional year, when A.R. (24) took four at sugar in the five nights preceding his departure from N. Cornwall. We know of three others that have been taken since then, two from South Devon and one from N.E. Hampshire. One wonders how long it will be before *loreyi* goes the way of *L. l-album* L. (L-album Wainscot) 1933 and subsequently, and *unipuncta* 1928 and 1957, and becomes comparatively common here. On sugar *loreyi* sits very quietly with its wings tightly closed, quite unlike *unipuncta*, which keeps its wings flat, ready to take off at the least excuse.

Leucania impura Hübn. (Smoky Wainscot). In a series of 18, bred from wild larvae found in April on *Dactylis glomerata*, all specimens show more or less conspicuous light brown wedge-shaped areas adjacent to the margins of the hindwings. Many caught specimens also show this characteristic, which is rare in mainland specimens.

Leucania obsoleta Hübn. (Obscure Wainscot). This occurs in numbers in the marsh on Tresco, an unexpected find on visit D.

Triphaena comes Hübn. (Lesser Yellow Underwing), as noted by Blair (4), has developed well marked characteristics. Over half of the population may be referred to ab. *sagittifer* Cockayne (8). This variety occurs in the Hebrides and occasionally on the mainland of Britain. A.R. has one from Dungeness and one from Gloucestershire, and Mr. W. Reid has three from Sheffield. From breeding figures of 100 per cent. in a brood of 170, 30 per cent. in a brood of 220, and 70 per cent. in a brood of 100 (A.R., December, 1956), it is difficult to determine whether or not it is a recessive, and it will probably be necessary to breed from two known parents to find out. Many of the darker specimens have suffused hindwings approaching ab. *curtisii* Newm. Another prominent feature is the prevalence of well marked red or dark stigmata and of a reddish suffusion on the forewings. One specimen was bred from a wild larva and another caught combining ab. *sagittifer* with ab. *rufa* Tutt. A number are beautifully mottled and clouded with purple-brown, through which frequently the *sagittifer* markings show. (Fig. 5.)

Hydraecia micacea Esp. (Rosy Rustic). Many of this species are of a bright red form and several ab. *aurantia* Richardson were taken.

Amathes xanthographa Schiff. (Square-spot Rustic). The majority of specimens are bright red, many crossed by transverse lines, sometimes heavily in the terminal area (see Part 3).

Eumichtis lichenea Hübn. (Feathered Ranunculus). This has developed a very distinct race (see Part 3). A small number have been taken at light and sugar each September, and one was taken in early July, 1957, but the main emergence is evidently much later. Moths bred from wild April larvae emerged 15th October to 4th November.

Thalpophila matura Hufn. (Straw Underwing). Two specimens of a very striking variety (see Part 3) were taken on visit A and a further specimen on visit E. Another distinct variety, having the darker markings on all four wings a bright brownish-red, was taken on visit A. There is one similar specimen at Tring.

Hadena conspersa Schiff. (Marbled Coronet). Its breeding area is apparently confined, on Tresco, to one hillock which is covered with *Silene maritima*. Moths and larvae were to be found here and nowhere else on visit A. However, in April, May, June and July, 1957, moths appeared freely in traps three-quarters of a mile away in either direction. The September larvae did not produce moths till the following June. The local form resembles S. Devon specimens except that the yellowish clouding often found in Devon and Cornish specimens appears to be absent.

Agrotis puta Hübn. (Shuttle-shaped Dart) is, we consider, a subspecies, very bright in both sexes, the ♀ varying from blue to near black in colour (see Part 3).

Diataraxia oleracea L. (Bright Line Brown Eye) are bright and much suffused with orange.

Plusia aurifera Hübn. (Slender Burnished Brass). A specimen of this rarity was taken at light in the Abbey Gardens on 14th September, 1956. Two others only have been taken during the last 100 years: one at Torquay on 7th October, 1943, by F. H. Lees (19) and one at Timoleague, Co. Cork, on 21st October, 1946, by Mrs. Lucas. The status of the two, or possibly three, old British specimens is summarised by Lees (*loc. cit.*).

Lithosia quadra L. (Four-spotted Footman). Very common indeed on Tresco. In 1956 fresh specimens were emerging throughout visit A, and it may be significant that at this very time a number were being taken on the S. Devon and N. Somerset coasts. In 1957 the emergence started early in July but was finished by 9th September, two only being noted after that date.

Eupithecia castigata Hübn. (Grey Pug). A single specimen, taken on visit B, presented a minor problem. Though its markings were those of *castigata*, its colour exactly matched the somewhat sandy hue of *E. satyrata* Hübn. (Satyr Pug). The identity was determined by Mr. D. S. Fletcher on examination of the genitalia. There is no similar specimen at Tring. Perhaps the doubtful worn *satyrata* recorded by Adkin (1) was an ochreous *castigata*.

Eupithecia dodoneata Guen. (Oak Tree Pug). Another single April specimen was of a very pretty bright form with conspicuous red markings.

Alcis rhomboidaria Schiff. (Willow Beauty). This insect was not recorded by Blair and must have colonized the islands since 1925; yet we found the imago in May, June, July, August and September, and larvae were common in April, small on gorse and large on blackthorn. A bred series appears striking, both in its well defined markings and in its bright yellow-brown colour.

Lithina chlorosata Scop. (Brown Silver Lines). A very striking bright form with strongly contrasting cross-bars.

Lasiocampa quercus L. (Oak Eggar). A somewhat brightly coloured series was bred from wild larvae taken in April, which were of two distinct sizes. The females were all ab. *ochracea-virgata* Tutt.

Lasiocampa trifolii Schiff. (Grass Eggar). The Scilly race is normally coloured dark brown with a well defined pale subterminal stripe. Among a series of 35 bred from Tean, where the larvae were exceedingly numerous in April, there were three specimens, a male and two females, having an orange stripe. At Tring there are several specimens of this form from Scilly, and the form is apparently unnamed. There was also bred one paler grey-brown female which stood out among its darker companions. Only one larva was found on Tresco, full fed in early July, though males were fairly common

at light in August. Larvae in small numbers were found on Samson in April and May.

Agrotis lunigera Steph. (Crescent Dart) were common, appearing at the end of June and throughout July and August, a few stragglers being on the wing in the second half of September. The species is notable for the very dark colour of the forewings of the ♂, the greater part of the forewings being the same dark colour as in the ♀, and is probably referable to ab. *suffusa* Tutt. No normally coloured ♂ was seen.

Spilosoma lutea Hufn. (Buff Ermine) tend to have the black spots on the upper surface of the forewings almost entirely absent, ab. *denigrata* Homb., sometimes being reduced to a minute spot on the costa of each forewing.

Spilosoma lubricipeda L. (White Ermine) on the other hand are very heavily spotted with small black dots on the forewings. These dots may coalesce into lines.

Euproctis chrysorrhoea L. (Brown Tail) varies in the colour of the anal tuft from the usual dark brown to yellowy brown, almost the colour of *E. similis* Fues. (Yellow Tail).

Nycterosea obstipata Scop. (The Gem) seemed to be breeding in small numbers, specimens having been noted on visits A, B, C, E and G.

Eublemma parva Hübn. (Small Marbled) was an unexpected visitor to a M.V. trap on 5th July, as was *Rhodometra sacraria* L. (The Vestal) on 2nd July.

Vanessa cardui L. (Painted Lady). An imago was seen sunning itself on a rock on Tean in April, and larvae were found on Tresco in May, but no imagines were seen later in 1957.

Perhaps the most noticeable feature of the lepidoptera of the Scillies is their brightness. We kept on finding ourselves saying 'this is a brighter coloured insect than on the mainland'.

In Tresco Abbey there are a number of store boxes of lepidoptera. These comprise, first, a collection made by O. S. J. Moore principally on Tresco; secondly, a collection made by members of the Dorrien-Smith family, partly on Tresco and partly in Hertfordshire and elsewhere in England; and thirdly, a collection of insects taken on Tresco mostly by A.R. and the remainder by R.M.M. Unfortunately, of the first two collections, one insect only has a data label, the one insect being a most beautiful *Utetheisa pulchella* L. (Crimson Speckled Footman) captured by O.J.M. in May, 1924, on Tresco.

The list that follows in Part 4 of this article sets out all the insects mentioned in Blair's list (4), and all those recorded by either of us, and all other records since 1925 known to us. The list in Part 5 contains the names of species in the Tresco Abbey collection,

some of which may not have been taken in the Scillies, which are not included in the list in Part 4.

Doubtless further work will reveal a considerable number of additions to the lepidopterous fauna of the Isles of Scilly, particularly among the 'micros'. Nobody realizes better than we do how deficient our records are, and how short a time we have spent in the Scillies. We hope that any entomologist who visits the Scillies will be kind enough to make his records available to us, so that a supplementary list can be published later on. We too hope to make visits at times of year different from those of our seven visits already made, and also thoroughly to explore islands other than Tresco.

Visits were made by one or both of us to St. Agnes, Gugh, Samson, Bryher, St. Mary's, St. Helens, Tean, and Northwethal, but by far the greater part of the time was spent on Tresco. Hence Tresco records naturally predominate. We think that St. Mary's in particular will repay further investigation, especially its marshes.

The nomenclature and order of the 'macros' in the list in Part 4 is that used by Allan (2), and of the 'micros' that used by Meyrick (22). In all cases of doubt the identification of the 'micros' was kindly made or checked by Mr. J. D. Bradley of the British Museum, Natural History, by E.C.P.C. in some cases from mountings of the genitalia, or by H.C.H.

PART II—THE MICROLEPIDOPTERA

By Robin M. Mere

Except during visit D, when some 70 species of 'micros', excluding pyrales and plumes, were noted, the macrolepidoptera were given far more attention than the microlepidoptera. Even on visit D more time was spent on the 'macros' than the 'micros'. In all, larvae or pupae of some nine or ten species of 'micros' were obtained. It is in consequence rather surprising that so many species of 'micros' were recorded, a large proportion of which were additions to the Scilly list.

The most interesting event was the discovery of a moth new to the British Isles, and which is undoubtedly resident on Tresco. This is *Nothris congressariella* Bruand. Two were recorded on visit C, on 18th and 24th May, 1957, respectively (now in the collection of D.M. and L. T. Ford), one on visit D, at the beginning of July (now in the collection of E.C.P.C.), and three on visit G in the latter half of September (two in collection of R.M.M. and one in the British Museum, Natural History). Lhomme (20) states that this species is found as an imago in France, especially in the south and on the Atlantic seaboard, in May and June, and again in September and

October. He adds that the larva, found from July to September and from October to May, feeds on *Scrophularia aquatica, S. canina, S. lucida, Inula viscosa, Vincetoxicum nigrum,* and *Artemisia vulgaris.* There is plenty of *Scrophularia* on Tresco. In the British list *congressariella* should come next before *N. verbascella* Hübn. My thanks are due to Mr. J. D. Bradley for his kindness and skill in rapidly identifying the species. (Fig. 11.)

Next in interest was the discovery that *Crocidosema plebeiana* Zell. is breeding on Tresco. Two were taken, one of each sex, on visit D at or near Mercury Vapour light, and two more, again one of each sex, were found on visit G, this time by searching the undergrowth and smoking close to *Lavatera arborea* (Tree Mallow), the food-plant. These are believed to be the fourth to seventh examples of this insect to be recorded in the British Isles, the three previous ones having been taken in Devonshire. Subsequently several were bred by H.C.H. and R.M.M. from larvae obtained by gathering seed heads of *L. arborea,* as to which see Huggins and Mere (17).

An entirely unexpected insect was *Elachista exiguella* Frey. The only previously published record is that of Bradley (5) of one taken in Co. Clare, Eire, and the specimen taken by E.C.P.C. on 29th June, 1957, is thought to be the first in England. It is possible that this species has been taken in the past in Scilly, and recorded as *E. nigrella* Haw., which is included in Blair's list.

Blair (4) comments on the existence of species feeding on pine, pine feeding species known from Tresco such as *Evetria buoliana* Schiff. and *E. sylvestrana* Curt.

One *Aristotelia lucidella* Steph. was noted at Mercury Vapour light in a reed bed on 2nd July, apparently the first to be recorded from west of Dorset.

Some unexpected migrants were seen. A great surprise on visit D was to take at a Mercury Vapour trap placed among Marram grass on a sandhill on the seashore one perfect *Heterographis oblitella* Zell. Of recent years this species has been recorded from Essex and Suffolk only, and no record is known of its appearance west of the Isle of Wight.

Diasemia ramburialis Dup. was seen at Mercury Vapour light on both visits D and F. On the last two nights of visit D three and four respectively *Margaronia unionalis* Hübn. were recorded at Mercury Vapour traps in the Abbey Gardens. One was damaged but not worn, and the other six appeared to be freshly emerged. It may well be that they were the offspring of an early migrant. It was very disappointing that we were unable to prolong our visit so as to see if further specimens appeared on succeeding nights.

Crambus contaminellus Hübn. was a notable record on both visits D and G.

Another very welcome and unexpected insect was *Pammene aurantiana* Staud. One imago was caught on visit D, apparently the first from west of Gloucestershire and Dorset; see Wakely (28). I do not recollect seeing any common maple, the reputed food-plant, in the Abbey Gardens or elsewhere, but there is sycamore. I suspect that *aurantiana* has some food-plant other than maple. The insect was seen in flight close to Tresco Abbey itself during the day.

The few specimens of that variable insect *Polychrosis littoralis* Westw., taken at Tresco, are perhaps a little paler and brighter than average but do not seem to me to be referable to the form from Annet, Isles of Scilly, described by Turner (27).

Further work will undoubtedly rapidly and greatly increase the present total of some 175 'micros' recorded from the Scillies. We took one *Coleophora* now in the possession of E.C.P.C., so far unidentified, and it may prove to be another addition to the British list.

It must be emphasized that in most cases the classification of abundance of microlepidoptera in Part 4 right-hand column is tentative in the extreme. Except for a few common insects, our knowledge is too restricted to be able to say with any confidence whether an insect is common, uncommon or rare.

PART III—DESCRIPTIONS OF CERTAIN NEW RACES AND VARIETIES OF MACROLEPIDOPTERA FOUND IN THE ISLES OF SCILLY

By AUSTIN RICHARDSON

Leucania unipuncta Haworth ab. **nigra-suffusa** ab. nov. (Fig. 6.)

Forewings suffused on the upper sides with black, through which the normal markings show; undersides black. Hindwings black above and beneath, except for the basal third of the undersides, which are greyish-white. Thorax and legs blackish-brown, abdomen black. One specimen of this variety was taken among 80 normals. A similar ♂ specimen, taken at Southsea by J. R. Langmaid, is figured in *Proc. S. Lond. Ent. & Nat. Hist. Soc.* 1955: pl. III, Fig. 12.

Type ♀: Tresco, Isles of Scilly, Cornwall, 17.ix.57, A.R.

Paratype ♂: Southsea, Hampshire, 28.ix.54, J. R. Langmaid (Langmaid coll.).

Thalpophila matura Hufnagel ab. **trescoensis** ab. nov. (Fig. 12.)

This striking variety has the sub-terminal areas of the forewings

Fig. 1: *Agrotis puta* ssp. *insula*. ♂ Type. Fig. 2: *Agrotis puta* ssp. *insula*. ♀ Type. Fig. 3: *Eumichtis lichenea* ssp. *scillonea*. ♂ Type. Fig. 4: *Eumichtis lichenea* ssp. *scillonea*. ♀ Type. Fig. 5: *Triphaena comes* ab. *sagittifer* Cockayne. Fig. 6: *Leucania unipuncta* ab. *nigro-suffusa*. ♀ Type. Figs. 7, 8, 9: *Cosymbia puppillaria* Hubn. Fig. 10: *Amathes xanthographa* ab. *semi-fasciata*. ♂ Type. Fig. 11: *Nothris congressariella* Bruand. Fig. 12: *Thalpophila matura* ab. *trescoensis*. ♂ Type.

and the reniform stigmata of a pale straw colour. In fresh specimens the pale areas contrast strongly with the dark fringes. The outer hindwing band is so pale as to be almost obsolete. The variety appears to be scarce, only three specimens being seen during six weeks spent in August and September, 1956 and 1957, in the Scillies, though there may have been one or two other worn specimens.

Type ♂ : Tresco, Isles of Scilly, Cornwall, 13.ix.56, A.R.

Paratype ♂ : Tresco, Isles of Scilly, Cornwall, 15.ix.56, A.R.

Amathes xanthographa Schiffermüller ab. **semifasciata** ab. nov. (Fig. 10.)

The terminal half of the forewings is darkened with fuscous through which the black nervures show clearly. The fuscous area ends just outside the orbicular and contrasts strongly with the clear red basal half. This is crossed by two wavy lines, one near the base and the other just inside the orbicular. The nervures on the outer half of the hindwing are also darkened.

Type ♂ : Tresco, Isles of Scilly, Cornwall, ix.56, A.R.

Eumichtis lichenea Hübner ssp. **scillonea** ssp. nov. (Figs. 3, 4.)

This constant form comes near to ab. *albipunctata* Siviter Smith, but owing to its darker markings is much more extreme. The stigmata, especially the reniform, are white or white-centred marbled with black, and stand out very clearly, giving much the same contrasted effect as in some Scottish specimens of *Drybotodes protea* Schiff. ab. *variegata* Tutt. I have two dozen caught specimens and ten others bred from wild Tresco larvae. Mr. A. J. Wightman tells me that Mr. G. E. L. Manley and he bred about 50 similar specimens from wild St. Mary's larvae found by G.E.L.M. in April, 1953. Most specimens have markings of a striking blackish tint, though less extreme on both fore- and hindwings than in ab. *aetnia* Turati. In a few a dark olive-green is more prominent and some are suffused with red. Mr. P. Siviter Smith has most kindly enabled me to compare my series with three paratypes which remain in his collection. He has presented his types to Tring.

Type ♂ : Tresco, Isles of Scilly, Cornwall, ix.57, A.R.

Allotype ♀ : Bred x.57 from wild larva taken Tresco, Isles of Scilly, Cornwall, A.R.

Two Paratype ♂♂ : Tresco, Isles of Scilly, Cornwall, ix.56, A.R.

Two Paratype ♀♀ : Bred x.57 from wild larvae taken Tresco, Isles of Scilly, Cornwall, iv.57, A.R.

Paratypes ♂ & ♀ are in the Rothschild-Cockayne-Kettlewell Collection, Tring, and Paratypes ♂ & ♀ in the British Museum, Natural History.

Agrotis puta Hübner ssp. **insula** ssp. nov. (Figs. 1, 2.)

Male. Forewing. Ground colour tilleul buff varying by irrorate with snuff brown and drab; medial area usually very pale; proximad of the

antemedial fascia the anterior half of the wing is densely irrorate with fuscous; antemedial and postmedial fasciae variable in breadth and degree of development, black and contrasting sharply with the pale ground colour. Hindwings white; veins and terminal interspaces anterior of vein Cu_2 fuscous.

Female. Both wings heavily suffused with fuscous; orbicular area on forewing and distal half of fringes on hindwing alone remaining pale. In some specimens there is a little light, white irroration distal of the postmedial fascia.

Type ♂, Allotype ♀, and Paratype ♂♂ and ♀♀ all bred viii.57 from a specimen taken on Tresco, Isles of Scilly, Cornwall, v.57, by R.M.M.

The Type ♂, the Allotype ♀, and Paratypes ♂ & ♀ are in the Rothschild-Cockayne-Kettlewell Collection, Tring, and Paratypes ♂ & ♀ are in the British Museum, Natural History.

I am indebted to Mr. D. S. Fletcher for his kind assistance in describing *A. puta* ssp. *insula*.

PART IV—THE LEPIDOPTERA RECORDED FROM THE ISLES OF SCILLY

In the case of the less frequently recorded species, the initials of the captors are given by Blair (4). These are Rev. H. Harpur Crowe (H.H.C.), F. Jenkinson (F.J.), F. Norgate (F.N.), B. W. Adkin (B.W.A.), Mrs. M. S. Boscawen (M.S.B.), O. J. S. Moore (O.J.S.M.), F. W. Frohawk (F.W.F.), W. N. Blair (W.N.B.), and K. G. Blair himself (K.G.B.). Blair states that the records of H.H.C., F.J., F.N., O.J.S.M. and M.S.B. are mostly from Tresco, and those of B.W.A. and K.G.B. mainly from St. Mary's. Apart from lists of captures supplied to him by entomologists and his own collecting, Blair incorporated several lists in his list, and for convenience these are specified in the references at the end of this article under numbers 1, 10, 23, 25 and 26.

In the following list a dash indicates that a species is not recorded. Blair's remarks, sometimes abbreviated, are given in the middle column. All records in the right-hand column are from Tresco unless otherwise stated. We have in a few cases added a comment on Blair's remarks.

Name of Insect	Blair's List	Our List
Danaus menippe Hübn. (Milkweed)	—	One seen on Tresco by Commander Dorrien-Smith's mother in the late thirties. One, possibly the same insect, seen St. Agnes in 1938 (18).
Pararge aegeria L. (Speckled Wood)	B.W.A.	—
Maniola jurtina L. ssp. *cassiteridum* Graves (Meadow Brown)	Abundant.	Abundant everywhere.
Vanessa atalanta L. (Red Admiral)	Fairly common.	Several seen, Tresco and St. Mary's.
V. cardui L. (Painted Lady)	Fairly common.	As above, also larvae. One imago Tean.
V. urticae L. (Small Tortoiseshell)	Fairly common.	A number seen everywhere.
Nymphalis polychloros L. (Large Tortoiseshell)	—	Three recorded in 1934, Frohawk (15).
N. io L. (Peacock)	Fairly common.	—
Polyommatus icarus Rott. (Common Blue)	Common.	Fairly common on all islands.
Lycaena phlaeas L. (Small Copper)	Common.	Common on all islands.
Pieris brassicae L. (Large White)	Common.	Common on Tresco and St. Mary's.
P. rapae L. (Small White)	Common.	As above.
P. napi L. (Green Veined White)	Common.	—
Colias hyale L. (Pale Clouded Yellow)	M.S.B. about 1900	—
C. croceus Four. (Clouded Yellow)	Common in some years.	A few in 1957 on St. Mary's and St. Helen's.
Gonepteryx rhamni L. (Brimstone)	B.W.A.	—
Acherontia atropos L. (Death's Head Hawk)	In some years not uncommon.	One visit A.
Herse convolvuli L. (Convolvulus Hawk)	In some years not uncommon.	Common visit A, ova obtained and over 100 larvae distributed. One each on visits E and G. Visit C, one.
Sphinx ligustri L. (Privet Hawk)	—	
Laothoe populi L. (Poplar Hawk)	M.S.B. and O.J.M. stated to be fairly common.	Fairly common.
Macroglossum stellatarum L. (Hummingbird Hawk)	Common.	Fairly common Tresco, one Tean, April, 1957.

Name of Insect	Blair's List	Our List
[*Celerio euphorbiae* L. (Spurge Hawk)]	H.H.C. (10) states that the gamekeeper on Tresco, who was a very observant man, told him he was almost sure he had seen the larva on *Euphorbia paralias* in the Abbey Gardens. Confirmation seems to us necessary before the species is admitted to the list.	—
C. galii Schiff. (Bedstraw Hawk)	—	One ♀ on Tresco, 27.vii.45, taken by R. S. Tubbs.
C. livornica Esp. (Striped Hawk)	B.W.A. and F.W.F. by the latter at the Lighthouse on St. Agnes. Lighthouse now, 1956-57, not in use.	—
Cerura vinula L. (Puss)	Larvae not uncommon.	—
Notodonta ziczac L. (Pebble Prominent)	F.J. and K.G.B.	Fairly common.
Pterostoma palpina Clerck (Pale Prominent)	—	A few.
Phalera bucephala L. (Buff Tip)	—	A few.
Thyatira batis L. (Peach Blossom)	—	A few.
Orgyia antiqua L. (Vapourer)	K.G.B. larvae.	—
Euproctis chrysorrhoea L. (Brown Tail)	—	A few emerging end of visit D.
E. similis Fues. (Yellow Tail)	Common.	Uncommon.
Lymantria monacha L. (Black Arches)	—	One visit E, a great surprise.
Lasiocampa quercus L. (Oak Eggar)	Fairly common.	Uncommon.
L. trifolii Schiff. (Grass Eggar)	F.J., B.W.A., and O.J.M.	Rare Tresco, uncommon Samson, common Tean.
Macrothylacia rubi L. (Fox)	F.J. and M.S.B. Latter stated formerly larvae were very common, but the species seemed to have disappeared by 1925.	—
Nola albula Schiff. (Kent Black Arches)	O.J.M. 5 on Tresco,	One visit A, common visit D, several visit E. Several on Bryher, D.M.

Name of Insect	Blair's List	Our List
Celama confusalis H.S. (Least Black Arches)	O.J.M. 2 on Tresco.	Fairly common.
Atolmis rubricollis L. (Red-necked Footman)	O.J.M. common on Tresco.	Larvae swarming all over Tresco, and imagines visits C and D.
Lithosia quadra L. (Four spotted Footman)	Noted by several observers both on St. Mary's and Tresco, also Tean, F.J.	Common from mid-July to early September.
Eilema griseola Hübn. (Dingy Footman)	—	One each, visits A and E.
E. lurideola Zinck. (Common Footman)	—	A few.
E. complana L. (Scarce Footman)	—	A few.
Spilosoma lubricipeda L. (White Ermine)	Common.	Common and variable.
S. lutea Hufn. (Buff Ermine)	Common.	Common.
Phragmatobia fuliginosa L. (Ruby Tiger)	Common.	Common, also on St. Mary's.
Arctia caja L. (Garden Tiger)	Abundant.	Common or excessively common everywhere.
Utetheisa pulchella L. (Crimson Speckled)	O.J.M. several specimens in 1923 and freshly emerged individuals in 1924 suggest that the species breeds regularly.	—
Callimorpha jacobaeae L. (Cinnabar)	Common.	Common.
Euxoa nigricans L. (Garden Dart)	B.W.A. and K.G.B.	—
E. tritici L. (White Line Dart)	Common.	Common, a pretty light form predominates.
E. obelisca Schiff. (Square Spot Dart)	Less common than tritici.	Fairly common.
Agrotis segetum Schiff. (Turnip)	Common.	Common everywhere
A. puta Hübn. (Shuttle-shaped Dart)	Common.	Common on Tresco, Bryher, St. Mary's and doubtless other islands, and variable.
A. trux Hübn. ssp. *lunigera* Steph. (Crescent Dart)	H.H.C., F.J., and B.W.A., but in 1925 had apparently not been taken of recent years.	Common on Tresco, emerging end June, throughout July and August, and stragglers in September.
A. exclamationis L. (Heart and Dart)	B.W.A.	Common, shows no variation.
A. ipsilon Hufn. (Dark Swordgrass)	Common.	Common everywhere.
A. ripae Hübn. (Sand Dart)	—	Three visit D, larvae on Bryher, R.P.D.
Lycophotia varia Vill. (True Lovers Knot)	K.G.B. 1911 and 1913, O.J.M. 1924.	Common, large, bright and single brooded, emerging from end June well into August; also St. Mary's, R.F.B.

Name of Insect	Blair's List	Our List
Peridroma porphyrea Schiff. (Pearly Underwing)	Common.	Common.
Diarsia brunnea Schiff. (Purple Clay)	O.J.M.	A few.
D. festiva Schiff. (Ingrailed Clay)	B.W.A. and O.J.M., though said to be very common.	Common, some nice forms.
D. rubi View. (Small Square Spot)	Common.	Common, also on St. Mary's.
Ochropleura plecta L. (Flame Shoulder)	Common.	Common everywhere.
Amathes c-nigrum L. (Setaceous Hebrew Character)	Common.	Common.
A. triangulum Schiff. (Double Square Spot)	B.W.A.	—
A. xanthographa Schiff. (Square Spot Rustic)	Common.	Common and variable everywhere.
Axylia putris L. (Flame)	—	Uncommon.
Triphaena comes Hübn. (Lesser Yellow Underwing)	Common.	Common everywhere and variable.
T. orbona Hufn. (Lunar Yellow Underwing)	O.J.M., one only.	—
T. pronuba L. (Large Yellow Underwing)	Common.	Common everywhere.
T. janthina Schiff. (Lesser Broad Bordered Yellow Underwing)	Common.	Common.
T. interjecta Hübn. (Least Yellow Underwing)	H.H.C. Tresco, F.J. Tean.	—
Mamestra brassicae L. (Cabbage)	Common.	Fairly common everywhere.
M. persicariae L. (Dot)	—	A few.
Polia nebulosa Hufn. (Grey Arches)	O.J.M. Tresco.	A few.
Diataraxia oleracea L. (Bright Line Brown Eye)	Fairly common.	Common and variable.
Ceramica pisi L. (Broom)	Fairly common.	Fairly common.
Hadena nana Hufn. (Shears)	O.J.M.	Fairly common, April to September.
H. trifolii Hufn. (Nutmeg)	Fairly common.	Common.
H. serena Schiff. (Broad Barred White)	K.G.B.	Fairly common.
H. conspersa Schiff. (Marbled Coronet)	Mostly by the earlier collectors.	Common; the dark markings are sometimes reduced so that there is some resemblance to *H. compta*.
H. bicruris Hufn. (Lychnis)	Common.	Common.
Orthosia stabilis Schiff. (Common Quaker)	—	Common.

Name of Insect	Blair's List	Our List
Panolis flammea Schiff. (Pine Beauty)	—	Uncommon.
Tholera popularis Fabr. (Feathered Gothic)	—	Two visit A.
T. cespitis Schiff. (Hedge Rustic)	F.J.	—
Leucania pallens L. (Common Wainscot)	Common.	Common everywhere.
L. impura Hübn. (Smoky Wainscot)	Common.	Fairly common.
L. obsoleta Hübn. (Obscure Wainscot)	—	Local, Tresco.
L. littoralis Curt. (Shore Wainscot)	B.W.A. and F.J.	Common; also on Bryher, D.M.
L. unipuncta Haw. (White Speck)	B.W.A.	Three visit A, 2 visit E, many visits F and G; also on Bryher, R.P.D., and on St. Mary's, R.F.B.
L. vitellina Hübn. (Delicate)	B.W.A .and O.J.M.	Three visit A, one Bryher, R.P.D.
L. loreyi Dup. (Cosmopolitan)	—	One visit F.
Cucullia chamomillae Schiff. (Chamomile Shark)	K.G.B.	Common.
C. verbasci L. (Mullein Shark)	Fairly common.	Common.
C. umbratica L. (Shark)	Fairly common.	Several, visit E.
Aporophila nigra Haw. (Black Rustic)	—	Fairly common.
Eumichtis lichenea Hübn. (Feathered Ranunculus)	B.W.A., F.J. and O.J.M.	Common, also on Bryher and St. Mary's.
Antitype xanthomista Hübn. (Black Banded)	O.J.M., several.	Three, visit A.
Omphaloscelis lunosa Haw. (Lunar Underwing)	B.W.A., O.J.M., and probably larvae K.G.B.	Uncommon.
Agrochola circellaris Hufn. (Brick)	—	A few, visit A.
Citria lutea Ström (Pink Barred Sallow)	—	A few, visit A.
Cirrhia icteritia Hufn. (Sallow)	B.W.A.	—
Cryphia muralis Forst. (Marbled Green)	Common.	Common, also on St. Helens and Bryher.
[*Apatele alni* L. (Alder)]	Blair records a larva with some reservation. It would seem better to have confirmation before including this species.	—
A. tridens Schiff. (Dark Dagger)	—	One, visit D.
A. psi L. (Grey Dagger)	K.G.B.	—
A. rumicis L. (Knotgrass)	Common.	Common, a light form.

Name of Insect	Blair's List	Our List
Amphipyra tragopogonis Clerck (Mouse)	B.W.A. and M.S.B.	Common.
Mormo maura L. (Old Lady)	B.W.A. and M.S.B.	—
Apamea monoglypha Hufn. (Dark Arches)	Common.	Common, none dark.
A. crenata Hufn. (Clouded Bordered Brindle)	—	Rare, visit C.
A. unanimis Hübn. (Small Clouded Brindle)	O.J.M., one specimen.	—
A. obscura Haw. (Dusky Brocade)	—	Rare, visit C.
A. secalis L. (Common Rustic)	Very common and variable.	Common.
Procus strigilis Clerck (Marbled Minor)	B.W.A. and F.N.	Fairly common.
P. furuncula Schiff. (Cloaked Minor)	Common.	Fairly common.
Luperina testacea Schiff. (Flounced Rustic)	Fairly common.	Very common visit A, rather uncommon visit F, also Bryher.
Euplexia lucipara L. (Small Angle Shades)	F.N. and O.J.M.	Fairly common.
Phlogophora meticulosa L. (Angle Shades)	Common.	Common everywhere.
Thalpophila matura Hufn. (Straw Underwing)	Common.	Fairly common and some nice varieties on Tresco, more common on St. Mary's.
Laphygma exigua Hübn. (Small Mottled Willow)	B.W.A. and O.J.M.	A few visit A, common visit D, also on St. Mary's, R.F.B.
Caradrina morpheus Hufn. (Mottled Rustic)	F.J. and O.J.M.	Common.
C. blanda Schiff. (Rustic)	B.W.A. and O.J.M.	Fairly common.
C. ambigua Schiff. (Vine's Rustic)	—	Common everywhere.
C. clavipalpis Scop. (Pale Mottled Willow)	Common.	Common everywhere.
Hydraecia oculea L. (Ear)	—	One visit E.
H. paludis Tutt (Saltern Ear)	—	One, visit E.
H. micacea Esp. (Rosy Rustic)	B.W.A.	Fairly common everywhere, including many light red forms.
Heliothis peltigera Schiff. (Bordered Straw)	H.H.C., O.J.M. and K.G.B.	One larva, visit C.
H. armigera Hübn. (Scarce Bordered Straw)	B.W.A.	—
Cosmia trapezina L. (Dunbar)	—	A few.
Rhizedra lutosa Hübn. (Large Wainscot)	—	One, visit G.
Arenostola pygmina Haw. (Small Wainscot)	B.W.A.	Fairly common.
Nonagria sparganii Esp. (Webb's Wainscot)	—	One found dead in August, 1957, by E. Grant.

Name of Insect	Blair's List	Our List
N. typhae Thunb. (Bulrush)	—	Two, visit A.
N. geminipuncta Haw. (Twin-spotted Wainscot)	—	Fairly common, visit E.
Chilodes maritima Tausch. (Silky Wainscot)	—	One, visit E.
Coenobia rufa Haw. (Small Rufous)	—	Rare, visit D.
Eublemma parva Hübn. (Small Marbled)	—	One, visit D.
Catocala nupta L. (Red Underwing)	—	One, St. Mary's, R.F.B.
Plusia chrysitis L. (Burnished Brass)	O.J.M., common.	Common everywhere.
P. festucae L. (Gold Spot)	B.W.A.	Rare Tresco, uncommon St. Mary's, R.F.B.
P. gamma L. (Silver Y)	Very common.	Common everywhere.
P. aurifera Hübn. (Slender Burnished Brass)	—	One, visit A.
Abrostola triplasia L. (Dark Spectacle)	More common than *tripartita*.	Common, also on St. Mary's, R.F.B.
A. tripartita Hufn. (Spectacle)	F.J.	—
Scoliopteryx libatrix L. (Herald)	F.J.	Uncommon, visits A and E.
Hypena proboscidalis L. (Snout)	Common.	Common, also St. Mary's.
Schranckia costraestrigalis Steph. (Pinion Streaked Snout)	O.J.M., common.	One, visit F, another visit G.
Zanclognatha tarsipennalis Treit. (Fanfoot)	O.J.M., two.	Uncommon.
Z. grisealis Schiff. (Small Fanfoot)	O.J.M., one.	Uncommon.
Pseudoterpna pruinata Hufn. (Grass Emerald)	—	Uncommon.
Hemithea aestivaria Hübn. (Common Emerald)	Common.	Fairly common.
Sterrha aversata L. (Riband Wave)	Fairly common.	Fairly common.
S. biselata Hufn. (Small Fanfoot Wave)	B.W.A. and O.J.M.	Common.
S. dimidiata Hufn. (Single Dotted Wave)	Common.	Fairly common.
S. trigeminata Haw. (Treble Brown Spot)	B.W.A. and M.S.B.	—
S. marginepunctata Göze (Mullein Wave)	Common.	Common, also on St. Mary's.
S. imitaria Hübn. (Small Bloodvein)	Fairly common.	Common.
Cosymbia puppillaria Hübn. (Blair's Mocha)	(Under *porata*.) F.N., Tresco.	Rare, see text.
Rhodometra sacraria L. (Vestal)	—	One, visit D.
Xanthorhoë ferrugata Clerck (Dark Barred Twin Spot Carpet)	B.W.A. and K.G.B.	Fairly common.
X. fluctuata L. (Garden Carpet)	Fairly common.	Common.

Name of Insect	Blair's List	Our List
Nycterosea obstipata Scop. (Gem)	—	A few, visits A, B, C, E and G.
Ortholitha mucronata Scop. (Lead Belle)	F.J., O.J.M. and K.G.B.	Uncommon.
C. chenopodiata L. (Shaded Broad Bar)	F.J. and F.N.	—
Colostygia pectinataria Knoc. (Green Carpet)	—	Rare.
Perizoma affinitata Steph. (Rivulet)	—	One, visit D.
P. alchemillata L. (Small Rivulet)	—	One, visit D.
P. flavofasciata Thunb. (Sandy Carpet)	B.W.A.	Common.
Euphyia bilineata L. (Yellow Shell)	Very common.	Common.
Lyncometra ocellata L. (Purple Barred Carpet)	Fairly common.	Fairly common.
Plemyria bicolorata Hufn. (Blue Bordered Carpet)	Fairly common.	—
Chloroclysta siterata Hufn. (Red Green Carpet)	—	One, visit B.
Dysstroma truncata Hufn. (Marbled Carpet)	Common.	Common.
D. citrata L. (Dark Marbled Carpet)	O.J.M., two.	A few, St. Mary's, R.F.B.
Thera obeliscata Hübn. (Grey Pine Carpet)	Common.	Common.
Hydriomena furcata Thunb. (July Highflier)	F.J., F.N., O.J.M.	Common.
Triphosa dubitata L. (Tissue)	One, K.G.B.	—
Calocalpe undulata L. (Scallop Shell)	One, O.J.M.	—
Epirrhoë alternata Müll. (Common Carpet)	Fairly common.	Common.
E. galiata Schiff. (Galium Carpet)	Fairly common.	—
Eupithecia subumbrata Schiff. (Shaded Pug)	O.J.M.	—
E. subnotata Hübn. (Plain Pug)	H.H.C. and F.J.	Common.
E. pulchellata Steph. (Foxglove Pug)	Fairly common.	Common.
E. centaureata Schiff. (Lime Speck Pug)	Fairly common.	Fairly common.
[*E. trisignaria* H.S. (Triple Spotted Pug)]	Recorded by Adkin (1) doubtfully from a worn specimen, record requires confirmation.	—
[*E. satyrata* Hübn. (Satyr Pug)]	Recorded by Adkin (1) doubtfully from a worn specimen, record requires confirmation.	—
E. absinthiata Clerck (Wormwood Pug	H.H.C., B.W.A. and O.J.M.	—

Name of Insect	Blair's List	Our List
E. vulgata Haw. (Common Pug)	O.J.M., fairly common.	Common.
E. castigata Hübn. (Grey Pug)	B.W.A.	One, visit B.
E. nanata Hübn. (Narrow-winged Pug)	Fairly common.	Common, also St. Mary's.
E. dodoneata Guen. (Oaktree Pug)	—	Rare, visits B and C.
Chloroclystis coronata Hübn. (V Pug)	B.W.A. and K.G.B.	—
C. rectangulata L. (Green Pug)	B.W.A. and O.J.M.	Fairly common.
Gymnoscelis pumilata Hübn. (Double Spotted Pug)	Common.	Common everywhere.
Acasis viretata Hübn. (Yellow Barred Brindle)	B.W.A., M.S.B. and O.J.M.	Fairly common.
Abraxas grossulariata L. (Magpie)	Common.	Fairly common.
Lomaspilis marginata L. (Clouded Border)	—	Uncommon.
Cabera pusaria L. (Common White Wave)	Common.	Uncommon.
C. exanthemata Scop. (Common Wave)	Common.	Uncommon.
Ellopia fasciaria L. (Barred Red)	M.S.B. and O.J.M.	Fairly common.
Campaea margaritata L. (Light Emerald)	—	Fairly common.
Selenia bilunaria Esp. (Early Thorn)	F.J., O.J.M. and K.G.B.	Common.
Gonodontis bidentata Clerck (Scalloped Hazel)	O.J.M., three.	Common.
Crocallis elinguaria L. (Scalloped Oak)	F.J., O.J.M. and K.G.B.	Fairly common.
Ourapteryx sambucaria L. (Swallowtail Moth)	Common.	Fairly common.
Opisthograptis luteolata L. (Brimstone)	Common.	Common.
Semiothisa alternaria Hübn. (Sharp Angled Peacock)	—	One, visit E.
Erannis defoliaria Clerck (Mottled Umber)	M.S.B. and O.J.M.	Noted by A.K.
Biston betularia L. (Peppered)	O.J.M. and M.S.B.	Fairly common, all typical, larvae feeding on Quercus ilex, visit E.
Alcis rhomboidaria Schiff. (Willow Beauty)	—	Common.
Cleorodes lichenaria Hufn. (Brussels Lace)	H.H.C., F.J. and O.J.M.	Common.
Gnophos obscurata Schiff. (Annulet)	B.W.A.	—
Lithina chlorosata Scop. (Brown Silver Lines)	Common.	Common, also on Tean.
Zygaena filipendulae L. (Six Spot Burnet)	B.W.A., F.J. and K.G.B.	Common, also on St. Helens.
Aegeria musciformis View. (Thrift Clearwing)	B.W.A.	Locally abundant on Bryher, including larvae on visit B.
Hepialus sylvinus L. (Orange Swift)	B.W.A.	Uncommon.

Name of Insect	Blair's List	Our List
Salebria fusca Haw.	O.J.M.	—
S. betulae Göze.	One, K.G.B.	—
S. palumbella Fabr.	—	Common.
Phycita spissicella Fabr.	—	One, visit E.
Plodia interpunctella Hübn.	—	One, visit D.
Ephestia elutella Hübn.	—	Noted by C.G.C. and R.M.M.
E. figulilella Gregs.	O.J.M.	—
Heterographis oblitella Zell.	—	One, visit D, E.C.P.C.
Cateremna terebrella Zinck.	—	Uncommon.
Homoeosoma nimbella Zell.	F.J. and O.J.M. Probably this refers to the next species, *saxicola*, not then distinguished.	—
H. saxicola Vaughan	See under *nimbella*.	A few.
Myelois cribrella Hübn.	—	A few.
Eurhodope advenella Zinck.	—	Rare.
Cryptoblabes bistriga Haw.	—	Rare.
Meliphora grisella Fabr.	F.J.	—
Aphomia sociella L.	Common.	Common.
Crambus pascuellus L.	—	Several.
C. pratellus L.	F.J.	—
C. culmellus L.	F.J.	Common everywhere.
C. hortuellus Hübn.	F.J.	Common.
C. perlellus Scop.	F.J.	A few.
C. inquinatellus Schiff.	—	Common, St. Mary's, R.F.B.
C. geniculeus Haw.	F.J.	Common everywhere.
C. contaminellus Hübn.	—	Rare.
C. selasellus Hübn.	—	Recorded by C.G.C., and one, visit E.
Platytes cerusella Schiff.	F.J.	Common.
Hydrocampa nymphaeata L.	F.J.	—
Diasemia ramburialis Dup.	—	One, visit D, another visit F.
Stenia punctalis Schiff.	Fairly common.	Common.
Margaronia unionalis Hübn.	H.H.C., one.	Seven, visit D.
Notarcha ruralis Scop.	In many lists.	Common.

Name of Insect	Blair's List	Our List
Eurrhypara hortulata L.	F.J.	Fairly common.
Phlyctaenia ferrugalis Hübn.	By most recorders.	Common: an emergence in January, 1958, A.K.
P. prunalis Schiff.	K.G.B.	Common on St. Mary's.
P. sambucalis Schiff.	K.G.B.	Uncommon.
Nomophila noctuella Schiff.	Common.	Common.
Pyrausta cespitalis Schiff.	By most recorders.	Fairly common Tresco, common Bryher.
P. asinalis Hübn.	O.J.M.	Common.
Loxostege verticalis L.	—	One, visit D.
Scoparia lineola Curt.	O.J.M.	Uncommon.
S. angustea Steph.	O.J.M.	Common.
S. frequentella Staint.	—	Uncommon.
S. cembrae Haw.	—	Uncommon.
S. basistrigalis Knaggs	O.J.M.	Uncommon.
Mesographe forficalis L.	O.J.M.	Common.
Endotricha flammealis Schiff.	Common.	Common.
Pyralis glaucinalis L.	—	Uncommon.
P. costalis F.	—	One, St. Mary's, R.F.B.
P. farinalis L.	B.W.A.	—
Aglossa pinguinalis L.	F.J.	Uncommon.
Synaphe angustalis Schiff.	H.H.C. and F.J.	Fairly common.
Platyptilia pallidactyla Haw.	—	Rare.
Alucita pentadactyla L.	F.J. and O.J.M.	Common Tresco and St. Mary's.
Pterophorus lithodactylus Treits.	F.N.	Uncommon, St. Mary's, R.F.B.
P. monodactylus L.	M.S.B. and O.J.M.	Common.
Stenoptilia zophodactyla Dup.	—	One Tresco, one St. Mary's.
S. pterodactyla L.	F.N.	—
Fumea casta Pall.	—	Common, also St. Helens.
Lozopera dilucidana Steph.	F.J.	—
Phalonia smeathmanniana Fab.	—	Uncommon.
P. badiana Hübn.	—	Uncommon.
P. atricapitana Steph.	—	A few.
Phtheochroa maculosana Haw.	—	Fairly common.

Name of Insect	Blair's List	Our List
Euxanthis angustana Hübn.	—	One, visit E.
E. zoegana L.	—	A few.
E. hamana L.	F.J.	Uncommon.
Batodes angustiorana Haw.	F.J.	Fairly common, also on St. Mary's. Bred from pupa on Holm Oak.
Capua grotiana Fabr.	F.J. and O.J.M.	Fairly common everywhere.
Pandemis heparana Schiff.	M.S.B.	—
P. ribeana Hübn.	—	A few.
Tortrix musculana Hübn.	O.J.M.	Common everywhere.
Cnephasia longana Haw.	F.J.	—
C. conspersana Doug.	F.J. and K.G.B.	Common, also on Bryher and St. Helens. Bred from Sea Campion.
C. incertana Treits.	F.J. and O.J.M.	Uncommon.
Peronea aspersana Hübn.	F.J.	Fairly common.
P. latifasciana Haw.	—	Rare.
P. variegana Schiff.	O.J.M.	Common, also on St. Helens.
P. sponsana Fab.	O.J.M.	—
P. mixtana Hübn.	F.J. and O.J.M.	A few larvae, visit D.
P. hastiana L.	O.J.M.	A few.
Spilonota ocellana Fabr.	—	Uncommon.
Evetria buoliana Schiff.	—	One, visit D.
E. sylvestrana Curt.	—	Uncommon.
Crocidosema plebeiana Zell.	—	Four imagines and larvae.
Notocelia uddmanniana L.	F.J. and O.J.M.	Several.
N. rosaecolana Doubl.	O.J.M.	Uncommon.
N. trimaculana Haw.	F.J.	—
Eucosma corticana Hübn.	—	Uncommon.
E. trimaculana Don.	O.J.M.	A few.
E. citrana Hübn.	F.J. and K.G.B.	—
E. cana Haw.	—	Fairly common.
E. similana Hübn.	—	C.G.C.
Polychrosis littoralis Curt.	F.J. and O.J.M.	Uncommon, also St. Helens.
Endothenia ericetana Westw.	—	Fairly common.

Name of Insect	Blair's List	Our List
A. gyroploce pruniana Hübn.	—	A few.
A. purpurana Haw.	—	A few.
A. striana Schiff.	—	A few.
A. lacunana Dup.	F.J. and O.J.M.	Common everywhere and variable.
Hemimene petiverella L.	F.J.	—
Pammene aurantiana Staud.	—	One, visit D.
Laspeyresia aurana Fab.	—	One Tresco, one Tean, visit C.
L. pomonella L.	—	A few.
L. splendana Hübn.	—	One, visit E.
L. ulicetana Haw.	F.J. and O.J.M.	Very common everywhere.
Paltodora cytisella Curt.	F.J.	A few.
Aristotelia tenebrella Hübn.	F.J.	Fairly common, also on Bryher.
A. lucidella Steph.	—	One, visit D.
A. stipella Hübn.	F.J.	—
Gelechia umbrosella Zell.	F.J.	—
G. affinis Haw.	—	One, visit C.
G. mundella Doug.	F.J.	Fairly common.
G. desertella Doug.	F.J.	—
G. terrella Hübn.	F.J.	One on Bryher.
G. diffinis Haw.	F.J.	—
Phthorimaea plantaginella Staint.	—	One, visit G.
P. ocellatella Boyd	F.J.	—
P. obsoletella F.R.	—	Common.
P. instabilella Doug.	F.J. and M.S.B.	—
P. costella Westw.	—	A few.
P. marmorea Haw.	F.J. and M.S.B.	—
Nothris congressariella Bruand	—	Six specimens in all on visits C, D and G.
Oegoconia quadripuncta Haw.	F.J.	Several, also on Bryher.
Brachmia gerronella Zell.	—	Several.
Limnoecia phragmitella Stain.	—	One.
Dasycera sulphurella Fabr.	F.J. and O.J.M.	A few, visit C.
Endrosis lactella Schiff.	O.J.M.	A few.
Borkhausenia fuscescens Haw.	F.J.	—

Name of Insect	Blair's List	Our List
B. pseudospretella Staint.	F.N. and O.J.M.	Uncommon.
Depressaria heracliana L.	F.N., K.G.B. and O.J.M.	Common on Tresco and Bryher.
D. badiella Hübn.	—	Uncommon.
D. pimpinellae Zell.	F.J.	—
D. costosa Haw.	F.J.	Common.
D. umbellana Steph.	M.S.B.	—
D. applana Fabr.	O.J.M.	Fairly common.
D. alstroemeriana Clerck	O.J.M.	—
D. ocellana Fabr.	O.J.M.	—
D. yeatiana Fabr.	F.J. and O.J.M.	Fairly common.
Orneodes hexadactyla L.	F.J.	Fairly common.
Schreckensteinia festaliella Hübn.	F.J. (Tean) and O.J.M.	Uncommon.
Simaethis fabriciana L.	F.J.	Common everywhere.
Glyphipteryx fischeriella Zell.	—	Uncommon.
Elachista nigrella Haw.	F.J.	—
E. exiguella Frey.	—	One, visit D.
E. cerusella Schiff.	—	One, visit D.
E. cygnipennella Hübn.	—	A few, also on Bryher.
Argyresthia goedartella L.	F.J.	—
Hyponomeuta padella L.	F.J.	Several.
H. cognatella Hübn.	F.J. and F.N.	A few.
H. evonymella L.	—	A few.
Coleophora nigricella Steph.	F.J.	—
C. fuscedinella Steph.	—	Larvae on elm, St. Mary's.
C. laricella Hübn.	F.J.	—
C. discordella Zell.	F.J.	One on Bryher.
C. troglodytella Dup.	—	One, visit D.
C. caespititiella Zell.	F.J.	Uncommon.
Lithocolletis messaniella Zell.	F.J.	Mines on oak and beech.
L. trifasciella Haw.	F.J.	Common, also on St. Mary's.
Gracillaria tringipennella Zell.	F.J.	—
G. stigmatella Fabr.	F.J.	—
Epermenia chaerophyllella Göze	—	Larvae and imago.

Name of Insect	Blair's List	Our List
E. daucella Pey.	—	One, visit E.
Cerostoma vittella L.	—	One, visit E.
Plutella maculipennis Curt.	F.J., F.N. and O.J.M.	Common everywhere.
Acrolepia pygmaeana Haw.	—	One, visit G.
Lyonetia clerkella L.	F.J.	—
Oinophila v-flava Haw.	—	Fairly common visit D, also visit G.
Monopis rusticella Hübn.	O.J.M.	A few.
M. ferruginella Hübn.	F.J. [possibly a misidentification of *crocicapitella*]	—
M. crocicapitella Clem.	—	Fairly common.
Meessia argentimaculella Staint.	F.J.	—
Tinea pellionella L.	F.J.	A few.
T. pallescentella Staint.	—	Uncommon.
T. semifulvella Haw.	—	A few.
Nepticula aurella Fabr.	F.J.	—
N. salicis Staint.	F.J.	—

PART V

SPECIES (UNLABELLED) REPRESENTED IN THE TRESCO ABBEY COLLECTION

Maniola tithonus L. (Gatekeeper)
Coenonympha pamphilus L. (Small Heath)
Aphantopus hyperantus L. (Ringlet)
Argynnis selene Schiff. (Small Pearl-bordered Fritillary)
Limenitis camilla L. (White Admiral)
Polygonia c-album L. (Comma)
Papilio machaon L. (Swallowtail)
Leptidia sinapis L. (Wood White)
Mimas tiliae L. (Lime Hawk)
Smerinthus ocellatus L. (Eyed Hawk)
Deilephila porcellus L. (Small Elephant Hawk)
Malacosoma neustria L. (Lackey)
Saturnia pavonia L. (Emperor)
Drepana falcataria L. (Pebble Hooktip)
Parasemia plantaginis L. (Wood Tiger)
Arctia villica L. (Cream-Spot Tiger)
Panaxia dominula L. (Scarlet Tiger)
Anarta myrtilli L. (Beautiful Yellow Underwing)
Heliophobus anceps Schiff. (Bordered Gothic)
Eupsilia transversa Hufn. (Satellite)
Dypterygia scabriuscula L. (Bird's Wing)
Euclidimera mi Clerck (Mother Shipton)
Ectypa glyphica L. (Burnet Companion)
Plusia moneta Fabr. (Golden Plusia)
Acontia luctuosa Esp. (Four-spotted)
Colostygia didymata L. (Twin-spot Carpet)
Ecliptopera silaceata Schiff. (Small Phoenix)
Anaitis plagiata L. (Treble-bar)
Ligdia adustata Schiff. (Scorched Carpet)
Biston strataria Hufn. (Oak Beauty)
Ematurga atomaria L. (Common Heath)
Bupalus piniaria L. (Bordered White)
Chiasma clathrata L. (Latticed Heath)
Zygaena lonicerae Esp. (Narrow-bordered Five-spot Burnet)
Z. trifolii Esp. (Five-spot Burnet)
Zeuzera pyrina L. (Leopard)
Hepialus hecta L. (Gold Swift)

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BOOK REVIEW

British Millipedes (*Diplopoda*), by Gordon Blower (The Linnean Society of London-Synopses of the British Fauna No. II). 1958. pp. 74. 1 plate. 85 figs. Wrappers. Price 10s. 6d.

Students of our British Millipedes have always had difficulty in identifying their captures, there being no British monograph of these animals. In 1939 Mr. Brade-Birks published a list of our British species, with sources for description and illustration, but these were spread over many books and journals.

Mr. Gordon-Blower and the Linnean Society are to be congratulated on the production of this monograph. The publication will no doubt increase the number of students studying these interesting animals. The work is printed on good paper, the text is easily read and the illustrations clear. The plate depicts typical specimens. The introduction describes the general structure, movement, ecology and life-history of these animals. Then follows a classification with a check list, and a description of our species, giving size, colour, structure, distribution, and some details of the life-history. The characters used for identification are easily seen, and even where genitalia have had to be used they can generally be seen without dissection. Six species have been removed from the 1939 list, and four new ones added. The latter have all been discovered since the 1939 list. The total number in the list is 44.

E.E.S.

LEPIDOPTERA OBSERVED IN DEVON, 1957

Most of these notes refer to the north-west quarter of Devonshire, being the land that lies west of Torrington, to Cornish border as far south as Launceston.

Argynnis selene (Schf.). Several at Merton and Dowland Moor.

A. euphrosyne (L.). Common in deciduous woodlands.

A. paphia (L.). Generally distributed in woodlands.

A. aglaia (L.). Present right across the moors and coastal hills.

A. cydippe (L.). Oddly in deciduous woods.

Euphydryas aurinia (Rott.). One of the commonest butterflies of N.W. Devon, colonies across the moors and in open woods.

Melanargia galathea (L.). Commonly distributed, abundant on many moors.

Colias croceus (Fourc.). Seen almost on every sunny day from early July until 15th October; no more than two or three in one day. Seen mostly on open moorland at *Scabious* flowers, even in afforested areas.

Diacrisia sannio (L.). Dowland Moor.

Atolmis rubricollis (L.). Larvae especially abundant in Spruce plantations at Halwill.

Actebia praecox (L.). Sixty larvae at Dawlish Warren on 2nd June, mostly parasitized. A moth at Northam Burrows 28th June.

Nonagria geminipuncta (Haw.). Larvae at Dawlish.

Arenostala pygmina (Haw.) A moth on Molinia Moor at Halwill.

Leucania straminea Tr. Larvae at Dawlish.

Heliothis peltigera (Schf.). A moth at Braunton Burrows 27th June.

Eustrotia uncula (Clerck). A moth at Dowland Moor 28th May.

Schrankia costaestrigalis Steph. Common at Dawlish on 1st June and again on 17th August.

Ortholitha umbrifera Prout. Inhabits low gorse pads on wet moors of Torrington, Peters Marland and Dowland Moor.

O. plumbaria Fab. Occupies the same ground as *umbrifera* but is much more widely scattered and commoner, flying three weeks to a month later.

Thera variata (Schf.). Abundant in older spruce plantations of N.W. Devon.

Operophtera fagata (Scharf.). Larvae abundant on Sallow at Torrington.

Eupithecia tantillaria Bsd. In Spruce plantations at Torrington.

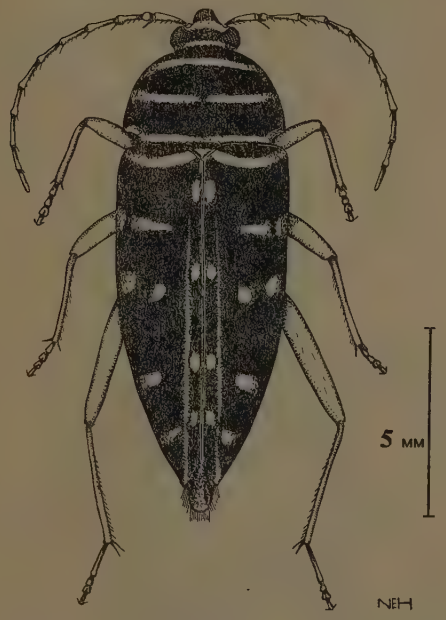
Orthonama lignata (Hb.). Peters Marland moor.

Cleora ribeata (Clerck.). In coniferous plantations at Halwill.

G. HAGGETT.

ALIEN INSECTS FOUND ALIVE IN BRITAIN

By N. E. HICKIN



1. *Megacyllene guttata* Cerambycidae

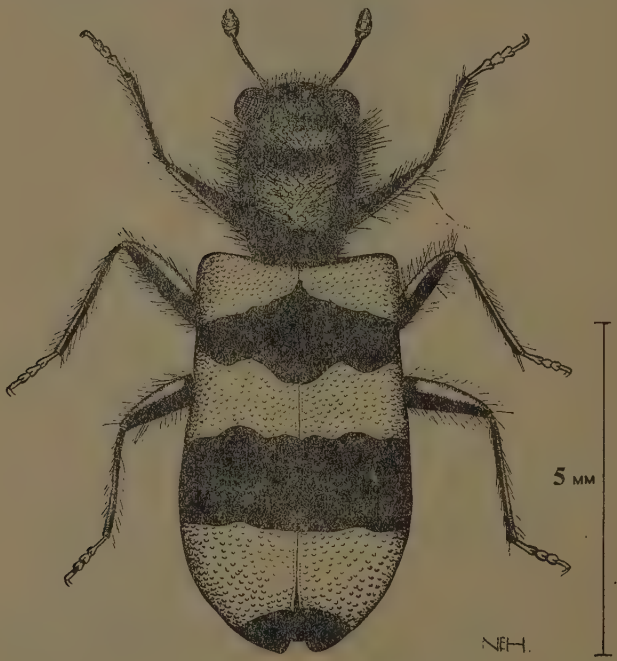
This is the first of a series of drawings of beetles, which though not native to Britain are from time to time found alive in this country. Perhaps the most fruitful sources of such beetles are the timber yards. The economic structure of the Timber Industry changed greatly at the commencement of the second world war with the result that timbers arrive at our ports in multiplicity of species and from countries where hitherto little trade in timber had taken place. Consequently a coleopterist with permission to collect in the dockside timber yards can have all the fun of collecting in the tropics with none of the disadvantages.

A number of living specimens of *Megacyllene guttata* emerged from a log of Verawood in the mills of William Marshall & Sons Ltd., in Holloway Road, London, N.7, in October, 1956. Verawood

is known commercially also as Maracaibo lignum vitae and is the species *Bulnesia orborea* originating in Venezuela.

The head, pronotum and elytra are barred and spotted with very bright canary yellow on a matt black background. The legs and antennae are light mahogany-coloured.

I wish to thank Mr. W. G. Marshall for giving me the specimens and information concerning the timber species, and Mr. E. A. J. Duffy for identifying the beetles.



2. *Trichodes apiarius* L.

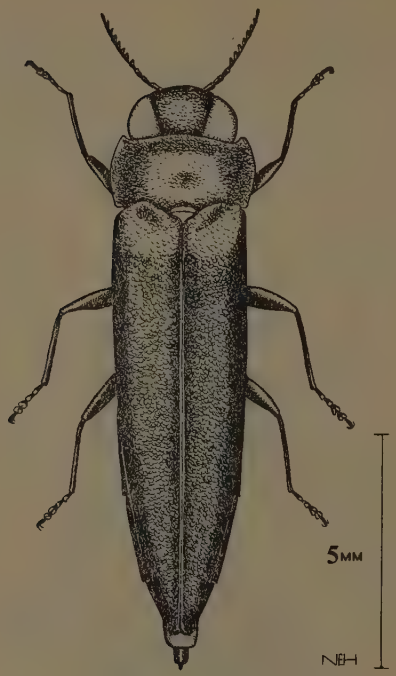
Brilliant coloration is common amongst the Cleridae, and this species is no exception. The head is dark bluish-green. The hairy pronotum is metallic greenish-blue, whilst the elytra are transversely barred with orange (with pits) and bright steely-blue violet.

The specimen from which the drawing was made was collected by M. G. Fraser in Ormskirk, Lancs., in July, 1948, and was thought to have been introduced into this country in vegetables from Belgium. The larvae are predators on woodboring insects, so that there would be some scope for it in the United Kingdom!

3. *Elaphidion naxum* Chevr.

Seven specimens of this species were collected at Bootle, Lancs., on 13.9.48 by M. G. Fraser from a consignment of Lignum vitae from Jamaica. This Cerambycid is covered with fine white pubescence, which when rubbed off gives the dark longitudinal marks on the elytra more prominence.

Lignum vitae is the timber converted from the two tree species *Guaiacum officinale* and *G. sanctum*, now only known up to 30 feet in height and 12 inches diameter, and is one of the hardest and heaviest timbers known. It weighs about 78 lbs. per cubic foot.



4. *Agrilus pannonicus* Piller and Mitterpacher

Two specimens of this species were reared by M. G. Fraser from larvae obtained from oak imported from Germany. The labels give the date 28.5.48 and Formby as the location.

This insect, although in the British list (Kloet and Hincks), is rarely found. No doubt with the increasing imports of European oak some addition may be made to its numbers. The elytra are dark steely-blue, pronotum metallic greenish-blue, and the head more golden.

All the specimens illustrated in this communication (1-4) are in the Rentokil Collection.

(*To be continued.*)

FOURTH SUPPLEMENT
to the
'Indexed Check-list of the British Lepidoptera, with the English Name of each of the 2,313 Species' (1947)

By I. R. P. HESLOP, M.A.

Section I

INTRODUCTORY NOTE

This Fourth Supplement to my 'Indexed Check-list' consists primarily of a list of the Additions, seventeen in number, made during the period from the beginning of January, 1955, to the end of February, 1958. This brings the total number of species to 2,386.

There is also a Section stating amendments to previous Supplements.

Corresponding augmentations and amendments to the Indices are understood in all cases. Two additions to the list of Authors are involved.

I am glad to take the opportunity of thanking Mr. J. D. Bradley, Mr. L. T. Ford, Mr. A. M. Morley, Mr. W. H. T. Tams, Mr. S. Wakely and the Baron de Worms for the very kind assistance and advice they have given with regard to items in this Supplement.

I. R. P. HESLOP.

'Belfield',
Burnham-on-Sea, Somerset.
1st March, 1958.

Section II

ADDITIONS (17)

(Closed 28th February, 1958)

PAPILIONES

2A	*Parnassius apollo *Linn.*	Apollo

SPHINGES

82A	Celerio hippophaes *Esp.*	Seathorn Hawk
82B	Celerio nicaea *de Prunner*	Mediterranean Hawk

AGROTIDES

357A	Aporophyla lunebergensis *Freyer*	Lighter Brown Rustic

GEOMETRIDES

664A	Xanthorhoë biriviata *Borkh.* (*pomoeriaria* Ev.)	Balsam Carpet

PYRALES

923A	Pachyzancla aegrotalis *Zell.* (*mutualis* Zell.)	Bolton Pearl
925A	Perinephela perlucidalis *Hübn.*	Lucid Pearl
946A	Pyralis manihotalis *Guen.*	Indian Tabby
971A	Trachonitis cristella *Hübn.*	Moncreaff's Knot-horn

PSYCHES

1111A	Euchromia lethe *Fabr.*	Basker

TORTRICES

1484A	Pammene aurantiana *Staud.*	Sycamore Piercer
1488A	Laspeyresia prunivorana *Rag.*	Orchard Piercer

TINEIDES

1596A	Gelechia oppletella *H.S.*	Highland Groundling
1631A	Nothris congressariella *Bruand*	Scillies Groundling
1643A	Stomopteryx polychromella *Reb.*	Broad-barred Sober
1740A	Depressaria prostratella *Constant*	Genista Flat-body
1903A	Coleophora albicornuella *Bradley* (*paripennella* auctt., non Zell.)	Glossy-brown Case

* Parnassius apollo, in Parnassiinae.

Section III

AMENDMENTS TO PREVIOUS SUPPLEMENTS

(a) In Section II of First Supplement:—

Under No. 479A (Blair's Pinion),
delete Lithophane lapidea *Hübn.*
and substitute Lithophane leautieri *Boisd.*

Under No. 1207A (A. orana),
delete Late-summer Fruit Twist
and substitute Summer Fruit Twist.

Under No. 1235A (Beautiful Twist),
delete Eulia formosana *Hübn.*
and substitute Eulia formosana *Fröl.*

(b) In Section II of Second Supplement:—

Under No. 382A (Giant Ear),

delete Hydraecia osseola *Staud.* (*hucherardi* Mab.)
and substitute Hydraecia hucherardi *Mab.*

Under No. 1791A (E. exiguella),

delete the full stop after Frey

BOOK REVIEW

Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina. Band I Teil I. Tyroglyphidae, herausgegeben von Hans-Jürgen Stammer. 1957. pp. 384, 261 text figs. Akademische Verlagsgesellschaft, Geest & Portig K.-G. Leipzig.

In this work three specialists have combined their knowledge to give a survey of the Central European tyroglyphids. It consists of two papers, the first by E. & F. Türk (Tyroglyphidae excl. Anoetinae) and the second by R. Scheucher (Anoetinae). Both papers deal with the systematics, the morphology of the adults and developmental stages, reproduction, biology and ecology and the techniques employed in their investigation. The larger part is devoted to the taxonomy of the Tyroglyphidae and 58 new species are described and figured. The keys, which are based on adult and nymphal characters, should prove to be very valuable. The work also contains lists of the hosts (the majority of which are insects) on which the hypopi (wandernymphs) were found.

The phenomenon of aparity, already known to occur in oribatids, is described for the first time in the tyroglyphids. A few pages are devoted to polymorphism encountered in the males. Four different types of males were found, three of which occur in the life cycle of one species.

It is to be regretted that the authors did not give a more extensive survey and discussion of the literature. This was probably due to pressure on space. The work is well printed and the figures are well reproduced. On the whole the editor, Prof. Stammer, and the authors must be congratulated on the production of this work. It should prove to be of much value to research workers in both the fields of taxonomy and ecology. The remaining parts of this series will be devoted to the Tarsonemini, the Uropodina and a classification of the Mesostigmata.

P. A. J. Ryke.

1111A *Euchromia lethe* F., an African Syntomid should be classified under the heading Bombyces. Its status is Arctiidae, subfamily Syntominae.—Editors.

AQUATIC COLEOPTERA IN THE LONDON AREA FIFTY YEARS AGO

By Sir Eric Ansorge, C.S.I., C.I.E., F.R.E.S.

So much of the open land which lay round London at the beginning of the century has since become 'built up area' that it may be of interest to record some species of aquatic beetles taken by me round London fifty-odd years ago.

In the list below the localities are indicated by the following abbreviations: **A**—Acton, **Al**—Alperton, **B**—Byfleet, **C**—Chiswick, **G**—Greenford, **H**—Hanwell, **Hr**—Harrow, **N**—Northwood, **P**—Perivale, **Pr**—Pinner, **R**—Richmond, **W**—Wembley, **Wm**—Wimbledon.

HYDRADEPHAGA

Haliplidae

Haliplus flavicollis Sturm (**Al.** 1902), *H. fulvus* (F.) (**P.** 1903), *H. fluviatilis Ab.* (**W.** 1899 and 1901, **N.** 1902), *H. lineatocollis* (Marsh.) (**W.** 1901).

Hygrobiidae

Hygrobia hermanni (F.) (**W.** 1901, **R.** 1902, **N.** 1904).

Dytiscidae

Noterus clavicornis (DeG.)* (**G.** 1903), *Laccophilus hyalinus* (DeG.) (**P.** 1903), *L. minutus* (L.) (**P.** 1903 and 1904), *Bidessus geminus* (F.) (**N.** 1904), *Hyphydrus ovatus* (L.) (**G.** 1903, **N.** and **P** 1904), *Hygrotus versicolor* (Schaller) (**B.** 1902), *Coelambus confluens* (F.) (**N.** 1904), *C. impressopunctatus* (Schaller) (**G.** and **N.** 1904), *Graptodytes granularis* (L.) (**G.** 1903 and 1904), *G. flavipes* (Ol.) (**N.** 1902), *Hydroporus dorsalis* (F.) (**W.** 1901 and 1903, **N.** 1904), *H. angustatus* Sturm (**G.** 1903 and 1904) *H. gyllenhalii* Schaller, (**Wm.** 1901), *H. palustris* (L.) (**Hr.** 1900, **W.** 1901, **G.** 1903), *H. erythrocephalus* (L.) (**Pr.**and **W.** 1901), *H. planus* (F.) (**W.** 1901, **N.** 1902 and 1904, **P.** 1903), *H. pubescens* (Gyll.) (**W.** 1901), *H. tessellatus Drap.* (**Pr.** 1901), *Agabus nebulosus* (Forst.) (**A.** 1901), *A. sturmii* (Gyll.) (**G.** and **P.** 1903), *A. chalconatus* (Panz.) **Pr.** and **Wm.** 1901, **G.** 1903), *A bipustulatus* (L.) (**Pr.** 1901, **G.** 1903), *Ilybius fuliginosus* (F.) (**P.** 1903), *I fenestratus* (F.) (**B.** 1904), *I. ater* (DeG.) (**G.** and **P.** 1903), *Copelatus agilis* (F.) (**G.** 1903), *Rantus grapii* (Gyll.) (**G.** 1903), *R. exsoletus* (Forst.) (**N.** 1904), *R. pulverosus* (Steph.) (**W.** 1901, **P.** 1903 and 1904, **N.** and **G.** 1904), *Colymbetes fuscus* (L.) (**W.** 1901), *Dytiscus marginalis* (L.) (**P.** 1904), *D. circumflexus* F. (**G.** 1903, **N.** 1904).

Gyrinidae

Gyrinus natator (L.) (**A.** 1901, **N.** 1904).

* See 1954, *Ent. mon. Mag.*, **90**: 41.

PALPICORNIA

HYDROPHILIDAE

Hydrochara caraboides (L.) (**G.** 1903, **N.** 1904), *Hydrobius fuscipes* (L.) (**Pr.** 1901, **N.** 1902), *Enochrus melanocephalus* (F.) (**G.** 1903), *E. testaceus* (F.) (**W.** 1901, **H.** 1902, **G.** 1903), *E. testaceus* (F.) (**W.** 1901, **H.** 1902, **G.** 1903), *E. ochropterus* (Marsh.) **G.** 1903), *E. coarctatus* (Gredl) (**G.** 1903, **N.** 1904), *Cymbiodyta marginella* (F.) (**N.** 1902, **G.** 1903), *Anacaena globulus* (Pay.) (**G.** 1903), *A. limbata* (F.) (**N.** 1902, **G.** 1903 and 1904), *Helochares lividus* (Forst.) (**N.** 1902), *Megalelophorus aquaticus* (L.) (**H.** and **P.** 1901, **G.** 1903, **P.** 1904), *Helophorus dorsalis* (Marsh.) (**P.** 1901, **G.** 1903), *H. flavipes* F. (**N.** 1902), *H. minutus* F. (**G.** 1903), *H. granularis* (L.) (**G.** 1903), *Hydrochus elongatus* (Schaller) (**P.** 1901, **G.** 1903), *Coelostoma orbiculare* (F.) (**N.** 1902), *Sphaeridium scarabaeoides* (L.) (data lost), *S. bipustulatum* F. (**C.** 1903), *Cercyon ustulatus* (Preys.) (**N.** 1902), *C. haemorrhoidalis* (F.) (**C.** 1903), *C. convexiusculus* Steph. (**C.** 1901).

BOOK REVIEW

The Lepidoptera of Formby, by M. J. Leech and H. N. Michaelis. pp. 38. 3 plates. Wrappers. Published by the Raven Entomological & Nat. Hist. Soc. (1958). Price 2s. 6d.

This excellent local list has been published at a very moderate price and deserves a wide sale. It forms a fitting memorial to that grand old man of Lancashire Entomology—the late G. de C. Fraser, whom so many of us remember with affection. As with all local lists, this should prove a spur to local entomologists to further explore their own district. Lancashire has for long been fortunate in its Naturalists and the diligence they have shown, and it is certain that this list will be welcomed as the latest in a celebrated series.

The Ellis list, later revised by Mansbridge, has of necessity formed the foundation of the present list. The Mansbridge revision, published in 1940 is now decidedly scarce and the present publication is therefore timely.

Only one general criticism would your reviewer make; the publication bears no proper publication date—not even a year! The Introduction is certainly dated—but this dating of Introductions (presumably at the time they are written) is a real nuisance to the bibliographer dealing with a publication bearing no other date. Often such a date is cited, in the absence of contrary evidence, as the date or year of publication. It needs little imagination to see how often such a presumption is erroneous.

One thing more should be singled out for praise; the list contains records of Microlepidoptera as well as Macrolepidoptera.

E.W.C.

A LIST OF MACRO-LEPIDOPTERA FOUND IN NORTH-EAST CAITHNESS

By J. H. Rosie

This list is a record of butterflies found over the past twenty years and moths over the past three years in that part of Caithness lying within about fifteen miles of Wick. My interest in the butterflies occurring here extends back to my schooldays before the war. Since the war, changes in the economy of the county have suggested that, in time, considerable changes might take place in the occurrence and distribution of the native Lepidoptera. I decided, therefore, three or four years ago, to record as fully as possible the butterflies and moths of this area.

The region under consideration consists of a strip of cultivated land, two or three miles wide, along the coast, and another belt of cultivated land between Wick and Thurso. The rest is more or less moorland. Trees are very scarce in Caithness and are to be found chiefly round the lairds' houses where 'plantings' of mixed deciduous trees are usually to be found. Those trees were almost all planted last century and have suffered greatly of late from neglect and two very severe gales in 1952 and 1953. (A coniferous 'planting' of about three acres in extent was almost entirely destroyed in 1953.) The more intensive post-war cultivation of land is tending to destroy the comparatively rich flora of the hedgerows, and the decay of the grouse-shooting estates has led to uncontrolled heather burning, although, in view of the extent of the Caithness moors, this may not produce any observable changes. Two sizeable pieces of land have been taken over by the Forestry Commission and planting has been going ahead over the past ten years.

This list cannot be regarded as nearly complete. I think that probably all the butterflies have been recorded and the majority of 'geometers' must be so regarded. This, however, is far from being the case with the night-flying 'noctuids'. Sugaring has been carried out sparingly due, for the most part, to the very bad summers of 1956 and 1957. I have not used light, although I hope to employ mercury vapour light this summer.

LIST OF SPECIES

RHOPALOCERA

SATYRIDAE

Maniola jurtina (L.)	Common.
Coenonympha tullia (Müll.)	Very common.
(*C. pamphilus* (L.)	I have not found this species here.)

NYMPHALIDAE

Argynnis aglaja (L.)	Restricted to two localities.
Vanessa atalanta (L.)	A few every year.

V. cardui (L.) — Irregular in appearance.
Aglais urticae (L.) — Much less common in last few years than formerly.

LYCAENIDAE

Polyommatus icarus (Rott.) — Fairly common.
Lycaena phlaeas (L.) — Never common and less so recently.

PIERIDAE

Pieris brassicae (L.) — Common.
P. rapae (L.) — Not uncommon, but more numerous some years than others.

(In his admirable book on Butterflies in the New Naturalist series, E. B. Ford makes the curious statement that *P. rapae* is seldom seen in Caithness.)

P. napi (L.) — Common.
Colias croceus (Geoff. in Fourcr.) — A few reached Caithness in summer of 1947.

HETEROCERA

SPHINGIDAE

Laothoë populi (L.) — Fairly common.
Acherontia atropos (L.) — Specimens have been taken from time to time, but none by me.
Herse convolvuli (L.) — One taken in 1947.

NOTODONTIDAE

Cerura vinula (L.) — Common.
Pheosia tremula (Cl.) — Common.
P. gnoma (F.) — Local and not at all common.
Notodonta ziczac (L.) — Common.
N. dromedarius (L.) — Common. I find the larvae only on birch.
Lophopteryx capucina (L.) — Common.

POLYPLOCIDAE (THYATIRIDAE)

Tethea or (Schiff.) — Found in one locality, but common there.

LYMANTRIIDAE

Orgyia antiqua (L.) — Locally common and seemingly confined to birch and hazel.

LASIOCAMPIDAE

Lasiocampa quercus callunae (Palmer) — Common on moors. The fully-grown larvae are most abundant in 'even' years, e.g. 1956.
Macrothylacia rubi (L.) — Fairly common on moors.

SATURNIIDAE

Saturnia pavonia (L.) — Very common some years, less so others.

DREPANIDAE

Drepana lacertinaria (L.) — Fairly common where its food-plant, birch, occurs.

ARCTIIDAE

Phragmatobia fuliginosa (L.)	Common.
Arctia caja (L.)	Common.
Parasemia plantaginis (L.)	Not uncommon.

CARADRINIDAE

Colocasia coryli (L.)	Larvae often common on hazel and birch.
Apatele megacephala (Schiff.)	Locally common.
A. psi (L.)	Fairly common.
Agrotis segetum (Schiff.)	Common.
A. ypsilon (Rott.)	One at sugar.
Lycophotia (Peridroma) porphyrea (Schiff.)	Not uncommon on moors.
Graphiphora augur (F.)	Fairly common.
Amathes agathina (Dup.)	Common.
A. baja (Schiff.)	Two bred from larvae.
A. xanthographa (Schiff.)	Common.
Ammogrotis lucernea (L.)	One at sugar.
Diarsia rubi (Vieweg)	Fairly common.
Ochropleura plecta (L.)	Several at sugar.
Triphaena pronuba (L.)	Very common. Dark forms make up a large proportion of the population.
T. janthina (Schiff.)	One taken.
Mamestra brassicae (L.)	Very common.
Diataraxia oleracea (L.)	Not uncommon.
Ceramica pisi (L.)	One bred from larva found on sallow.
Charaeas (Cerapteryx) graminis (L.)	Fairly common.
Eumichtis adusta (Esp.)	One bred from larva found on campion.
Euplexia lucipara (L.)	Fairly common.
Aporophyla nigra (Haw.)	Fairly common. Larvae found feeding on heather in May and June.
Dasypolia templi (Thunb.)	Three taken.
Xylophasia (Apamea) crenata (Hufn.)	Fairly common.
X. monoglypha (Hufn.)	Very common.
Celaena (Apamea) secalis (L.)	Common.
C. haworthii (Curt.)	Not uncommon on moors.
Procus strigilis (Cl.)	Fairly common.
Phlogophora meticulosa (L.)	Fairly common.
Phalaena typica (L.)	Common.
Hydraecia micacea (Esp.)	Common.
Leucania lythargyria (Esp.)	Fairly common.
L. conigera (Schiff.)	Fairly common.
Xylena exsoleta (L.)	Two taken.
Anarta myrtilli (L.)	Common.

PLUSIIDAE

Scoliopteryx libatrix (L.)	Common.
Plusia chrysitis (L.)	Fairly common.
P. iota (L.)	Fairly common. Larvae found on garden plants.
P. (pulchrina) v-aureum (Hübn.)	Not uncommon.
P. gamma (L.)	Generally common.
P. interrogationis (L.)	Not uncommon some years on moors.
Abrostola tripartita (Hufn.)	Common.
Hypena proboscidalis (L.)	Common.

STERRHIDAE

Cosymbia pendularia (Cl.)	Three from larvae found on birch.

HYDRIOMENIDAE

Ortholitha (chenopodiata) limitata (Scop.)	Not uncommon, but rather local.
Anaitis plagiata (L.)	Uncommon, but one or two taken most years.
Lygris prunata (L.)	Not uncommon.
L. testata (L.)	Common.
L. populata (L.)	Common.
Cidaria fulvata (Forst.)	Uncommon.
Dysstroma truncata (Hufn.)	Very common.
Chloroclysta miata (L.)	Not uncommon, but local.
C. siterata (Hufn.)	Found in only one locality.
Thera cognata (Thunb.)	Found in only one locality where juniper grows.
T. juniperata (L.)	One or two from same locality as previous species.
Xanthorhoë munitata (Schiff.)	Fairly common.
X. montanata (Schiff.)	Very common.
X. spadicearia (Schiff.)	Local and not common.
X. designata (Hufn.)	Fairly common.
X. fluctuata (L.)	Common.
Epirrhoë alternata (Müll.)	Common.
Calostigia pectinataria (Knoch)	Fairly common.
C. didymata (L.)	Abundant.
C. salicata (Hübn.)	Fairly common.
C. multistrigaria (Haw.)	One taken.
Lyncometra ocellata (L.)	Not common.
Plemyria bicolorata (Hufn.)	I know only one locality, but it is not uncommon there.
Perizoma alchemillata (L.)	Rather local, but common where it occurs.
P. albulata (Schiff.)	Common.
P. minorata ericetata (Curt.)	Common.
P. blandiata (Schiff.)	I do not find this species very common.
Euphyia bilineata (L.)	Common.
Oporinia filigrammaria (H.-S.)	Two or three taken and one bred from larva.
Entephria caesiata (Schiff.)	Very common on moors.
Operophtera brumata (L.)	Common.
Hydriomena furcata (Thunb.)	Very common.
Eupithecia nanata (Hübn.)	Abundant on moors.
Gymnoscelis pumilata (Hübn.)	Only one taken.

SELIDOSEMIDAE

Abraxas grossulariata (L.)	I have found this insect only at Wick, where it is very common.
Cabera pusaria (L.)	Two or three bred from larvae found on birch.
Selenia bilunaria (Esp.)	Larvae fairly common on birch and hazel.
S. lunaria (Schiff.)	Two bred from larvae on birch.
Gonodontis bidentata (Cl.)	Larvae common on birch, hazel and sallow.
Opisthograptis luteolata (L.)	Common.
Erannis aurantiaria (Esp.)	One or two bred from larvae found on birch.
E. defoliaria (Cl.)	Common.

HEPIALIDAE

Hepialus humuli (L.).	Common.
H. lupulinus (L.)	Fairly common.
H. fusconebulosus (Degeer)	Local, but common where found.

The form this local list takes is based on that used by Mr. H. D. Swain (1952, *Ent. Gaz.*, **3**: 109) and Mr. John E. Knight (1957, *Ent. Gaz.*, **8**: 115). The nomenclature used follows that of Kloet and Hincks (1945).

EUBLEMMA OSTRINA (HB.) IN EAST SUSSEX (LEP: PLUSIIDAE)

On the 31st May of this year (1958) I sugared a row of posts on the seaward side of the golf course between Rye Harbour and Camber, and took a female *Eublemma ostrina*. Other visitors to the sugar were *Apamea sordens* (Hufn.) (very abundant), *Agrotis puta* (Hübn.) and *A. exclamationis* (L.), *Hadena suasa* (Schiff.), *Heliophobus albicolon* (Hübn.) (three taken), one early *Leucania comma* (L.) (abundant a week later), and a specimen of the 'Plume' *Oxyptilus distans* (Zell.). This species is described as 'rare and local' by Beirne (*British Pyralid and Plume Moths*, p. 163), and Sussex is not one of the four counties mentioned in the account of its range.

The *E. ostrina* has been accepted by the Curator for deposition in the Rothschild-Cockayne-Kettlewell collection at Tring.

Houghton House,
Rye, Sussex.

M. W. F. TWEEDIE.

MACROLEPIDOPTERA RECORDS FROM S.W. MIDDLESEX

The fast-vanishing nature of the fauna of S.W. Middlesex prompts me to put on record from time to time the Macrolepidoptera which occur relatively infrequently in my mercury vapour trap or are of interest for other reasons.

Euxoa tritici (L.) occurs each year in small numbers.

Caradrina ambigua (Schiff.) has two broods each year and both broods are abundant.

Jaspidea fasciana (L.). A specimen was found in the trap in the morning of 18th July, 1958.

Earias clorana (L.) and *Pseudoips bicolorana* (Fuessly) both occur in small numbers.

Parascotia fuliginaria (L.) comes to the trap at infrequent intervals. A male was in the trap 20th July, 1958.

Feltham, Middlesex.
July, 1958.

E. W. CLASSEY.

Published 31st October, 1958.